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ABSTRACT

Measuring students' progress toward higher achievement has been the purpose of the National Assessment of Educational Progress (NAEP) since its inception in 1969. Students in public and nonpublic schools have been assessed in various subject areas on a regular basis, and the NAEP has also collected information about background variables that provide a context for interpreting assessment results and documenting the implementation of educational reform. Sections of this report present the results of science, mathematics, reading, and writing trend assessments, charting trends back to the first year in which each assessment was given. Trends in average performance over these time periods are discussed for students at ages 9, 13, and 17 for science, mathematics, and reading assessments, and for students in grades 4, 8, and 11 for the writing assessment. Trends in average performance differences between White and Black students, White and Hispanic students, and male and female students are also discussed. The overall pattern of science performance is one of early decline followed by recent improved performance. Nevertheless, the average 1996 score remains lower than that of 1969. In mathematics, trends indicate overall improvement across the assessment years, while in reading the pattern of average increases from 1971 through 1988 has not been sustained into the 1990s. In writing, the eleventh-grade trend has been downward, while eighth-grade scores have shown little consistency, and fourth-grade scores have changed little across the assessment years. A procedural appendix and data appendixes for each of the subject areas are attached. (Contains 40 figures and 42 tables.) (SLD)

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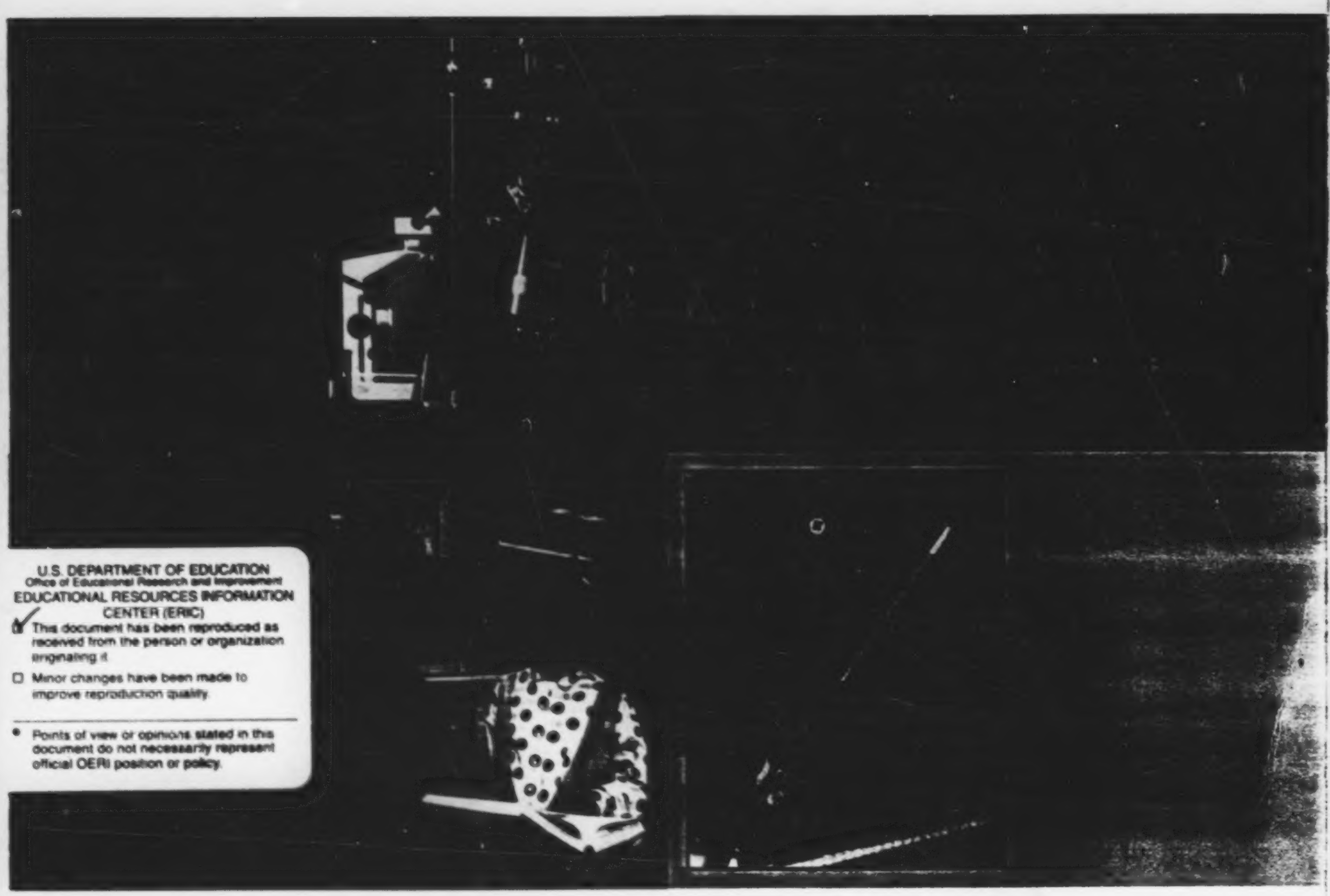
NAEP 1996 Trends in Academic Progress



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Achievement of U.S. Students in
• Science, 1969 to 1996 • Mathematics, 1973 to 1996
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NAEP 1996 Trends in Academic Progress

Achievement of U.S. Students in

• Science, 1969 to 1996 • Mathematics, 1973 to 1996
• Reading, 1971 to 1996 • Writing, 1984 to 1996

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September 1997

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Office of Educational Research and Improvement **NCES 97-985**

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Acknowledgments

Executive Summary

Introduction

As we approach the year 2000, efforts to increase the academic achievement of students and to prepare them for the 21st century have become a primary focus of parents, educators, and policy makers. During the 1990s, educational reform and increased expectations for all students to achieve their highest potential have been the hallmark of policies and programs set forth at the national, state, and district levels. In 1990, the President and governors adopted a set of six ambitious national education goals for the 21st century: ensuring that children start school ready to learn, raising high school graduation rates, increasing levels of education achievement, promoting science and mathematics achievement as well as literacy and lifelong learning, and freeing schools of drugs and violence.[1] Congress broadened these goals in 1994 to include improvements in teacher preparation and increased parental involvement in schools.[2] In 1997, the President strengthened the nation's commitment to rigorous education standards by proposing a voluntary program of national tests in reading at grade 4 and in mathematics at grade 8 to ensure that individual students across the country are provided equal opportunities to achieve high standards in these critical subject areas.

As new policies are implemented and changes in educational practices occur, information about trends in student achievement across time is critical for educators and policy makers to observe the overall effects of reform efforts. Measuring students' progress toward higher achievement has been the purpose of the National Assessment of Educational Progress (NAEP) since its inception in 1969. Students in both public and nonpublic schools have been assessed in various subject areas on a regular basis. In addition, NAEP collects information about relevant background variables that provide a meaningful context for interpreting the assessment results and for documenting the extent to which educational reform has been implemented.

The NAEP Long-Term Trend Assessments

One important feature of NAEP is its ability to document trends in academic achievement in core curriculum areas over an extended period of time. By readministering materials and replicating procedures from assessment to assessment, NAEP collects valuable information about progress in academic achievement and about whether the United States can meet the challenge of its national education goals.

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[1] Executive Office of the President. (1990). *National goals for education.* Washington, DC: U.S. Government Printing Office.

[2] Goals 2000: Educate America Act, Pub. L. No. 102-227 (1994).

The NAEP long-term trend assessments are separate from a series of newer NAEP assessments (called "main" assessments) that involve more recently developed instruments. While the long-term trend assessments have used the same sets of questions and tasks so that trends across time can be measured, the main assessments in each subject area have been developed to reflect current educational content and assessment methodoloy. In some cases, the main assessment in a particular subject area has been administered in more than one year, providing short-term trend results (e.g., mathematics in 1990, 1992, and 1994; and reading in 1992 and 1994). The use of both long-term trend and main assessments allows NAEP to provide information about students' achievement over time and to evaluate their attainment of more contemporary educational objectives. As each assessment is based on a different set of questions and tasks, scale score results and students' reports of educationally related experiences from the long-term trend assessments cannot be directly compared to the main assessments.

The following sections of this report present the results of the science, mathematics, reading, and writing trend assessments. These results chart trends going back to the first year in which each NAEP assessment was given: 1969/1970 in science, 1973 in mathematics, 1971 in reading, and 1984 in writing. Trends in average performance over these time periods are discussed for students at ages 9, 13, and 17 for the science, mathematics, and reading assessments, and for students in grades 4, 8, and 11 for the writing assessment. Trends in average performance differences between White students and Black students, White students and Hispanic students, and male and female students are also discussed.

Analysis Procedures

To provide a numeric summary of students' performance on assessment questions and tasks, NAEP uses a 0-to-500 scale for each subject area. Comparisons of average scale scores are provided across the years in which trend assessments have been administered and among subpopulations of students. Nationally representative samples totaling approximately 30,000 students were involved in the NAEP 1996 trend assessments.

The descriptions of trend results are based on the results of statistical tests that consider both the estimates of average performance in each assessment year as well as the degree of uncertainty associated with these estimates. The purpose of basing descriptions on such tests is to restrict the discussion of observed trends and group differences to those that are statistically dependable. Hence, the patterns of results that are discussed are unlikely to be due to the chance factors associated with the inevitable sampling and measurement errors inherent in any large-scale survey effort like NAEP. Throughout this report, all descriptions of trend patterns, differences between assessment years, and differences between subgroups of students which are cited are statistically significant at the .05 level.

Two distinct sets of statistical tests were applied to the trend results. The purpose of the first set of tests was to determine whether the results of the series of assessments in a given subject could be generally characterized by a line or a simple curve. Simple linear and curvilinear (or quadratic) patterns do not always provide a satisfactory summary description of the patterns of trend results. Hence, a second set of statistical tests were conducted which compared results for selected pairs of assessment years within each trend sequence. Two families of pairwise tests were carried out. One family of tests consisted of comparing the results from the first assessment year (base year) to the 1996 results. The second family of tests consisted of comparing the results from the previous assessment year (1994) to the 1996 results. It should be noted that statistically significant changes in student performance across a two-year period may be unlikely, and in fact, are not evident in the overall results or in the results for most subgroups of students presented in this report. Changes in the average achievement of populations or subpopulations are more likely to occur over extended periods of time. In addition, the inherent uncertainty associated with estimates of performance based on samples rather than entire populations necessitates consideration of standard errors in comparing assessment results, further constraining the likelihood that the magnitude of change which may occur between two years will be statistically significant. The characterizations of trend data that appear in the executive summary and in the following chapters of this report are based on the combined results of both the general tests and the two families of pairwise tests.

The results of each type of statistical test are presented in small grids that appear next to or below each of the figures in this report that display data for each assessment year. The results from tests comparing the base year and 1996 assessments are summarized in the column labeled with the asterisk symbol "*." Significant differences are denoted with a "+" or "-" sign indicating that the 1996 average score was either greater than or less than the base year score, respectively. Similarly, significant differences between 1994 and 1996 assessment results are denoted with a "+" or "-" sign under the column labeled with the dagger symbol "†" indicating that the 1996 average score was either greater or smaller than the 1994 average, respectively. The results from the linear and quadratic trend tests are summarized in the columns labeled "L" and "Q," respectively. Within each column, significant positive trends are denoted by a "+" sign and significant negative trends are denoted with a "-" sign. In tables where only the first and most recent assessment results are presented, significant differences between the base year and 1996 are indicated within the tables.

National Trends in Average Scale Scores

The national trends in science, mathematics, reading, and writing achievement are presented in Figure 1. In general, the trends in science and mathematics show early declines or relative stability followed by improved performance. In reading and writing, the results are somewhat mixed; although some modest improvement was evident in the trend reading assessments, few indications of positive trends were evident in the writing results.

Science. The overall pattern of performance in science for 9-, 13-, and 17-year-olds is one of early declines followed by a period of improvements. Among 17-year-old students, declines in performance that were observed from 1969 to 1982 were reversed, and the trend has been toward higher average science scores since that time. Despite these recent gains, the 1996 average score remained lower than that in 1969. After a period of declining performance from 1970 to 1977, the trend for 13-year-olds has been one of increasing scores. Although the overall linear trend was positive, there was no significant difference between the 1996 and

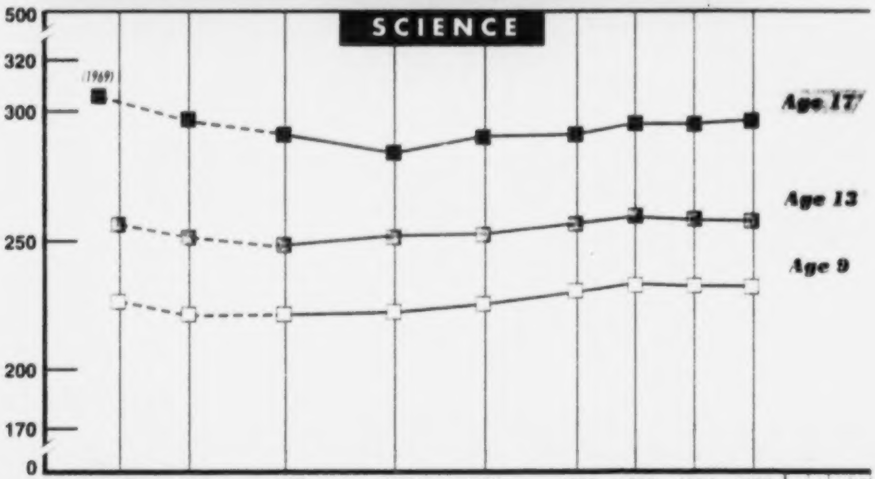
1970 average scores for these students. Except for the decline from 1970 to 1973 in average science scores for 9-year-olds, the overall trend shows improved performance, and the 1996 average score for these students was higher than that in 1970.

Mathematics. At all three ages, trend results indicate overall improvement in mathematics across the assessment years. Among 17-year-olds, declining performance during the 1970s and early 1980s was followed by a period of moderate gains. Although the overall pattern is one of increased performance, the average score in 1996 was not significantly different from that in 1973. The performance of 13-year-olds across the trend assessments shows overall improvement, resulting in a 1996 average score that was higher than the 1973 average. After a period of relative stability during the 1970s and early 1980s, 9-year-olds demonstrated improved performance. The overall trend for this age group was one of improved performance, and the average score in 1996 was higher than that in 1973.

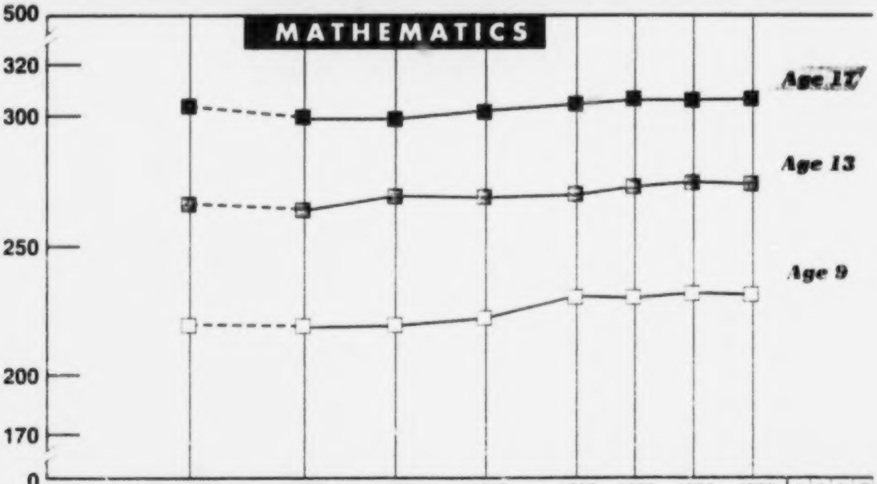
Reading. At age 17, the pattern of increases in average reading scores from 1971 to 1988 was not sustained into the 1990s. Although the overall pattern is one of improved performance across the assessment years, the average score of 17-year-olds in 1996 was not significantly different from that of their counterparts in 1971. Thirteen-year-olds have shown moderate gains across the trend assessments, and in 1996 attained an average score that was higher than that in 1971. The performance of 9-year-olds improved from 1971 to 1980, but declined slightly since that time. However, in 1996 the average score for these students remained higher than that of their counterparts in 1971.

Writing. Among eleventh graders, an overall pattern of declining performance is evident in the average writing scores across the assessment years. In 1996, the average score attained by these students was lower than that in 1984. The average writing score of eighth graders has fluctuated, reaching a low point in 1990 and rebounding in 1992. However, no consistent pattern of increases or decreases across the assessments was evident, and the 1996 average score for these students did not differ significantly from that of their counterparts in 1984. At grade 4, no significant changes were observed in students' average writing scores from 1984 to 1996.

Figure 1 Trends in Average Scale Scores for the Nation



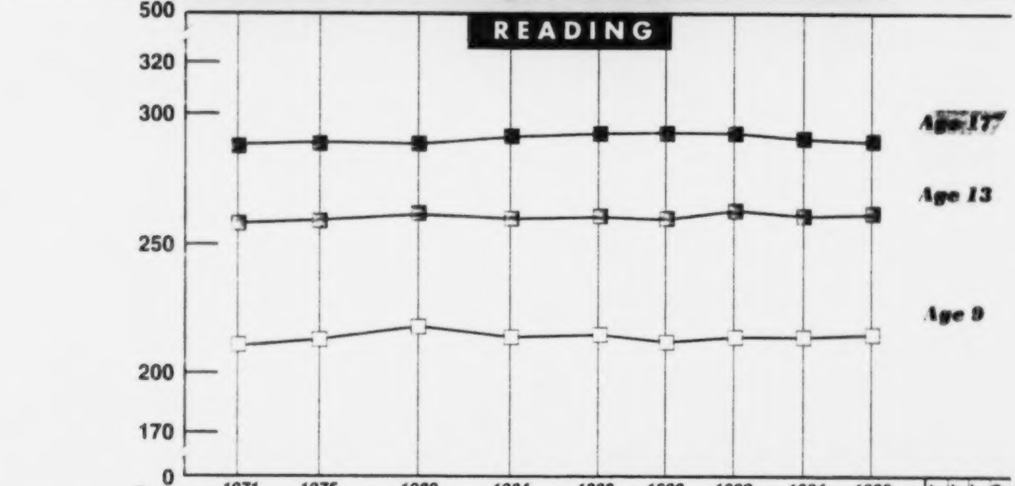
	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	305 (1.0)	296 (1.0)	290 (1.0)	283 (1.2)	289 (1.4)	290 (1.1)	294 (1.3)	294 (1.6)	296 (1.2)	–		–	+
Age 13	255 (1.1)	250 (1.1)	247 (1.1)	250 (1.3)	251 (1.4)	255 (0.9)	258 (0.8)	257 (1.0)	256 (1.0)			+	+
Age 9	225 (1.2)	220 (1.2)	220 (1.2)	221 (1.8)	224 (1.2)	229 (0.8)	231 (1.0)	231 (1.2)	230 (1.2)	+		+	+



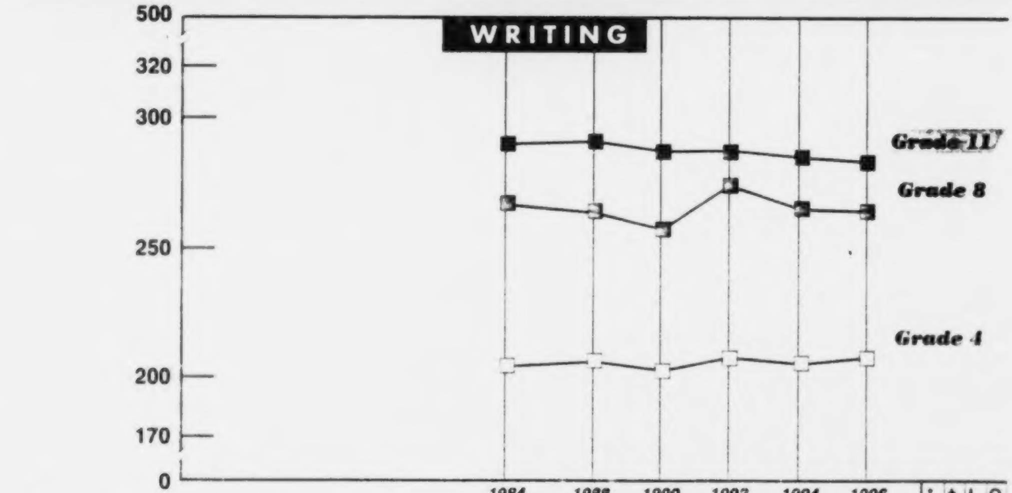
	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	304(1.1)	300(1.0)	299(0.9)	302(0.9)	305(0.9)	307(0.9)	306(1.0)	307(1.2)			+	+
Age 13	266(1.1)	264(1.1)	269(1.1)	269(1.2)	270(0.9)	273(0.9)	274(1.0)	274(0.8)	+		+	
Age 9	219(0.8)	219(0.8)	219(1.1)	222(1.0)	230(0.8)	230(0.8)	231(0.8)	231(0.8)	+		+	+

Figure 1 (continued)

Trends in Average Scale Scores for the Nation



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	285(1.2)	286(0.8)	286(1.2)	289(0.6)	290(1.0)	290(1.1)	290(1.1)	288(1.3)	287(1.1)			+	–
Age 13	255(0.9)	256(0.8)	259(0.9)	257(0.5)	258(1.0)	257(0.8)	260(1.2)	258(0.9)	259(0.9)	+		+	
Age 9	208(1.0)	210(0.7)	215(1.0)	211(0.7)	212(1.1)	209(1.2)	211(0.9)	211(1.2)	212(1.0)	+			–



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	290(1.6)	291(1.3)	287(1.0)	287(1.4)	285(1.2)	283(1.2)	–		–	
Grade 8	267(2.0)	264(1.3)	257(1.2)	274(1.3)	265(1.3)	264(1.0)				
Grade 4	204(1.5)	206(1.6)	202(1.5)	207(1.5)	205(1.6)	207(1.2)				

Standard errors of the estimated scale scores appear in parentheses. [– – –] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in the first assessment year.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Levels of Performance

A more in-depth understanding of students' academic progress across time can be gained by examining the types of abilities associated with different levels on the NAEP scale and the percentages of students who have attained those levels of performance across the trend assessments. Five levels of performance have been identified and described on the NAEP scale for each subject area: 150, 200, 250, 300, and 350.[3] The procedure for describing the five performance levels was the same in science, mathematics, and reading. Sets of questions were identified that were more likely to be answered correctly by students at one level than by those at the next lower level. Educators and curriculum experts representing each of the subject areas then carefully studied the sets of questions to develop descriptions for the five levels. These descriptions outline the concepts, skills, or processes demonstrated by correct responses to the questions at each level.

The procedure for describing the writing performance levels was somewhat different. Because the NAEP writing assessment is a direct measure of students' writing abilities, it does not contain questions or tasks that can be scored as correct or incorrect. Instead, students' responses to the writing tasks are rated according to the extent of task accomplishment. The descriptions of the five writing performance levels were developed by examining the ratings received by students whose overall performance was at one level in comparison to the ratings received by students at the next lower level.

Information about trends in students' attainment of performance levels is available back to 1977 in science, 1978 in mathematics, 1971 in reading, and 1984 in writing. Tables 1 through 4 present the percentages of students performing at or above each of the five levels in the first assessment year for which performance level data are available and in the 1996 assessment. In addition, the tables provide summary descriptions that characterize students' performance at each level.

Science. At age 9, the percentages of students attaining at least Levels 150, 200, 250, and 300 on the science scale increased between 1977 and 1996. Increases were also apparent in the percentages of 13-year-olds attaining at least Levels 150, 200, and 250. Although no significant increases were observed for 17-year-olds at the lower levels, the vast majority of students in this age group demonstrated the skills associated with these levels in both 1977 and 1996. At the two highest performance levels, 300 and 350, there was a significant increase between 1977 and 1996.

Mathematics. Similar to trends observed in science, the percentages of 9-year-olds at or above Levels 150, 200, 250, and 300 on the mathematics scale were higher in 1996 than in 1978. At age 13, nearly all students attained at least Levels 150 and 200 in both 1978 and 1996. There was an increase between the two assessment years in the percentages of 13-year-olds at or above Levels 200 and 250. Among 17-year-olds, performance at or above Levels 150, 200, and 250 was attained by nearly all students in both 1978 and 1996. The percentage of 17-year-old students reaching at least Levels 250 and 300 was higher in 1996 than in 1978.

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[3] In theory, performance levels above 350 and below 150 could have been defined; however, so few students in the assessment performed at the extreme ends of the subject-area scales that it was not practical to do so.

Reading. In comparison to the assessment results in 1971, greater percentages of 9-year-olds in 1996 attained at least Levels 150, 200, and 250 on the reading scale. At age 13, most students performed at or above the two lowest levels, 150 and 200, in both 1971 and 1996. Increases were observed between the two assessment years in the percentages of 13-year-olds performing at or above Levels 250, 300, and 350. The vast majority of 17-year-olds attained at least Levels 150, 200 and 250 in both 1971 and 1996. The percentages of 17-year-old students at or above Levels 200 and 250 were higher in 1996 than in 1971.

Writing. At grade 4, the percentages of students attaining each of the performance levels on the writing scale in 1996 were not significantly different from those in 1984. Nearly all eighth graders performed at or above Levels 150 and 200 in both 1984 and 1996. However, the percentages of students in grade 8 who attained at least Levels 200 and 250 in 1996 were lower than the percentages in 1984. Almost all eleventh graders reached at least Levels 150 and 200, and the vast majority reached at least Level 250, in both 1984 and 1996. However, there was a decrease between the two assessment years in the percentages of students at grade 11 who demonstrated performance at or above Levels 250 and 300.

Table 1

Percentages of Students Performing At or Above Science Performance Levels, Ages 9, 13, and 17, 1977 and 1996

Level		AGE 9		AGE 13		AGE 17	
		Percent in 1977	Percent in 1996	Percent in 1977	Percent in 1996	Percent in 1977	Percent in 1996
350	Can infer relationships and draw conclusions using detailed scientific knowledge	0 (0.0)	0 (0.1)	1 (0.1)	0 (0.2)	9 (0.4)	11 (0.9) *
300	Has some detailed scientific knowledge and can evaluate the appropriateness of scientific procedures	3 (0.3)	4 (0.5) *	11 (0.5)	12 (0.6)	42 (0.9)	49 (1.3) *
250	Understands and applies general information from the life and physical sciences	26 (0.7)	32 (1.2) *	49 (1.1)	58 (1.2) *	82 (0.7)	84 (0.9)
200	Understands some simple principles and has some knowledge, for example, about plants and animals	68 (1.1)	76 (1.0) *	86 (0.7)	92 (0.6) *	97 (0.2)	98 (0.3)
150	Knows everyday science facts	94 (0.6)	97 (0.5) *	99 (0.2)	100 (0.1) *	100 (0.0)	100 (***)

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly different than that in 1977.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table 2

Percentages of Students Performing At or Above Mathematics Performance Levels, Ages 9, 13, and 17, 1978 and 1996

Level		AGE 9		AGE 13		AGE 17	
		Percent in 1978	Percent in 1996	Percent in 1978	Percent in 1996	Percent in 1978	Percent in 1996
350	Can solve multistep problems and use beginning algebra	0 (***)	0 (***)	1 (0.2)	1 (0.1)	7 (0.4)	7 (0.8)
300	Can compute with decimals, fractions, and percents; recognize geometric figures; solve simple equations; and use moderately complex reasoning	1 (0.1)	2 (0.3) *	18 (0.7)	21 (1.2)	52 (1.1)	60 (1.7) *
250	Can add, subtract, multiply, and divide using whole numbers, and solve one-step problems	20 (0.7)	30 (1.0) *	65 (1.2)	79 (0.9) *	92 (0.5)	97 (0.4) *
200	Can add and subtract two-digit numbers and recognize relationships among coins	70 (0.9)	82 (0.8) *	95 (0.5)	99 (0.2) *	100 (0.1)	100 (***)
150	Knows some addition and subtraction facts	97 (0.3)	99 (0.2) *	100 (0.1)	100 (***)	100 (***)	100 (***)

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly different than that in 1978.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table 3

Percentages of Students Performing At or Above Reading Performance Levels, Ages 9, 13, and 17, 1971 and 1996

Level		AGE 9		AGE 13		AGE 17	
		Percent in 1971	Percent in 1996	Percent in 1971	Percent in 1996	Percent in 1971	Percent in 1996
350	Can synthesize and learn from specialized reading materials	0 (***)	0 (***)	0 (0.0)	1 (0.2) *	7 (0.4)	6 (0.8)
300	Can find, understand, summarize, and explain relatively complicated information	1 (0.1)	1 (0.3)	10 (0.5)	14 (1.0) *	39 (1.0)	39 (1.4)
250	Can search for specific information, interrelate ideas, and make generalizations	16 (0.6)	18 (0.8) *	58 (1.1)	61 (1.3) *	79 (0.9)	81 (0.9) *
200	Can comprehend specific or sequentially related information	59 (1.0)	64 (1.2) *	93 (0.5)	93 (0.6)	96 (0.3)	97 (0.5) *
150	Can carry out simple, discrete reading tasks	91 (0.5)	93 (0.7) *	100 (0.0)	100 (0.1)	100 (0.1)	100 (***)

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly different than that in 1971.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table 4 Percentages of Students Performing At or Above Writing Performance Levels, Grades 4, 8, and 11, 1984 and 1996

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Level		GRADE 4		GRADE 8		GRADE 11	
		Percent in 1984	Percent in 1996	Percent in 1984	Percent in 1996	Percent in 1984	Percent in 1996
350	Can write effective responses containing supportive details and discussion	0 (***)	0 (***)	0 (***)	1 (0.2)	2 (0.7)	2 (0.5)
300	Can write complete responses containing sufficient information	1 (***)	1 (0.2)	13 (1.8)	16 (0.8)	39 (2.4)	31 (1.5) *
250	Can begin to write focused and clear responses to tasks	10 (1.0)	13 (1.2)	72 (2.6)	66 (1.3) *	89 (1.0)	83 (1.4) *
200	Can write partial or vague responses to tasks	54 (2.0)	59 (1.5)	98 (0.9)	96 (0.5) *	100 (0.3)	99 (0.2)
150	Can respond to tasks in abbreviated, disjointed, or unclear ways	93 (1.3)	93 (0.7)	100 (***)	100 (0.1)	100 (***)	100 (***)

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Differences in Average Scale Scores Between Racial/Ethnic Groups of Students and Between Males and Females

As noted earlier, one of the national educational goals calls for increases in students' academic achievement. A stated objective of this goal is that the performance distribution for minority students will more closely reflect that of the student population as a whole.[1] In some of the subject areas assessed by NAEP, results indicated progress toward meeting this goal. Trends in the differences between average scores for subgroups of students are presented below.

Differences between White and Black Students. Although in 1996 White students attained higher average scores than their Black peers in each age group across the four subject areas, there was some indication that the gaps between White and Black students' average scores in science, mathematics, and reading have narrowed across the assessment years. Despite some fluctuations, however, the trend in writing scale score gaps demonstrates no consistent pattern of increases or decreases at any grade level.

In science, the trend toward smaller gaps among 17-year-olds is due predominately to a one-time decrease in the gap between 1982 and 1986. However, the gap in 1996 was not significantly different from that in 1969. The narrowing of the gap between average scores of White and Black students aged 9 and 13 occurred in the late 1970s or 1980s. Although there has been little change in the 1990s, the gaps for both 9- and 13-year-olds in 1996 were smaller than those in 1970.

In mathematics and reading, scale score gaps between White and Black students aged 13 and 17 narrowed during the 1970s and 1980s. Although there was some evidence of widening gaps during the late 1980s and 1990s, the scale score gaps in 1996 were smaller than those in the first assessment year for 13- and 17-year-olds in mathematics and for 17-year-olds in reading. Among 9-year-olds, scale score gaps in mathematics and reading have generally decreased across the assessment years, resulting in smaller gaps in 1996 compared to those in the first assessment year.

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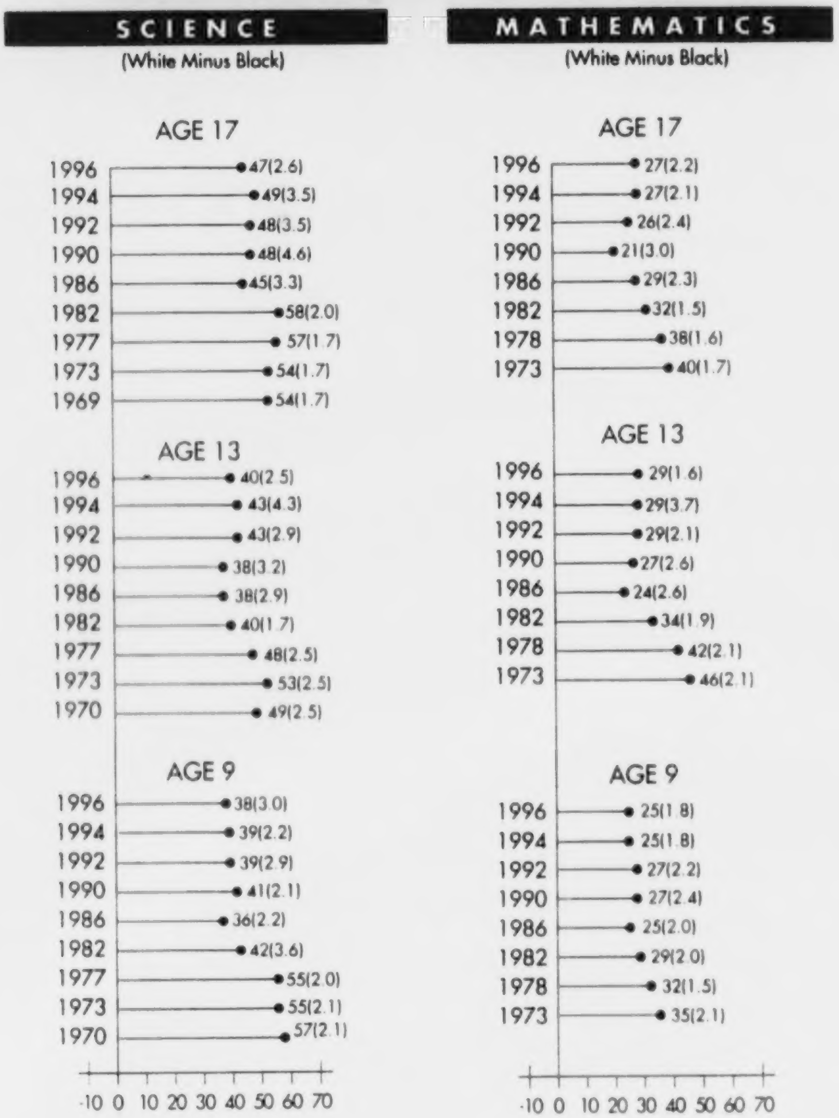
[1] Executive Office of the President. (1990). *National goals for education.* Washington, DC: U.S. Government Printing Office.

Figure 2

Trends in Differences in Average Scale Scores
White vs. Black Students

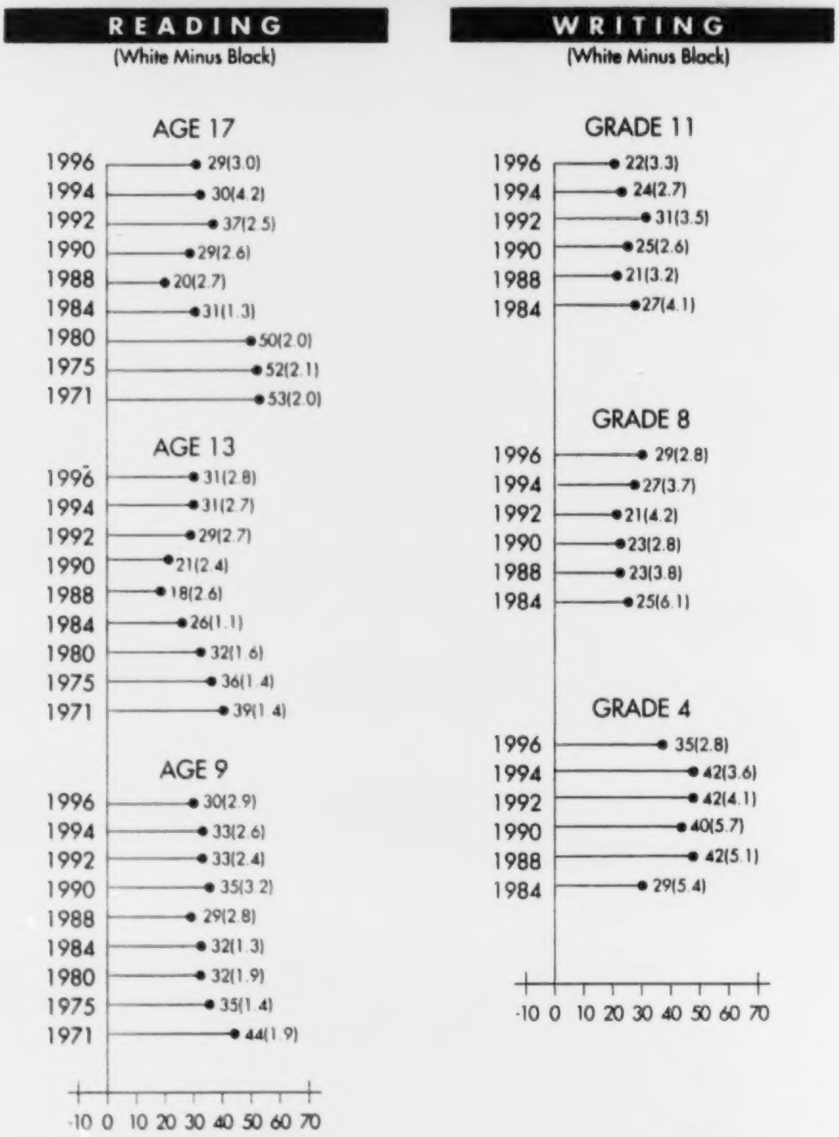


	*	‡	L	Q
Age 17			-	
Age 13	-		-	+
Age 9	-		-	+

	*	‡	L	Q
Age 17	-		-	+
Age 13	-		-	+
Age 9	-		-	

Figure 2
(continued)

Trends in Differences in Average Scale Scores
White vs. Black Students



	*	‡	L	Q
Age 17	–		–	+
Age 13			–	+
Age 9	–		–	

	*	‡	L	Q
Grade 11				
Grade 8				
Grade 4				

Standard errors of the estimated scale score differences appear in parentheses.

* Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in the first assessment year.

‡ Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Differences between White and Hispanic Students. In 1996, White students had higher average scores than Hispanic students at all three ages in each of the four subject areas. In science, mathematics, and reading, some significant changes in the magnitude of the gap between White and Hispanic students' average scores have occurred across the assessment years. However, no consistent pattern of increases or decreases is evident in the writing scale score gaps.

In science, there was some evidence that the gap between White and Hispanic 13-year-olds' average scores decreased between 1977 and 1982, but the gap has changed little since that time. The gap in 1996 among 13-year-olds was not significantly different from that in 1977.

In mathematics, the gap among 17-year-olds has generally decreased across the assessment years, resulting in a gap in 1996 that was lower than that in 1973. At age 13, the gap in mathematics scores decreased from 1973 to 1986. Although the gap appears to have widened somewhat since that time, the gap in 1996 was smaller than that in 1973.

In reading, scale scores gaps among 17-year-olds decreased from 1975 to 1990. However, recent assessment results revealed some widening of the gap, and in 1996 the gap was not significantly different from that in 1975.

Figure 3

Trends in Differences in Average Scale Scores
White vs. Hispanic Students

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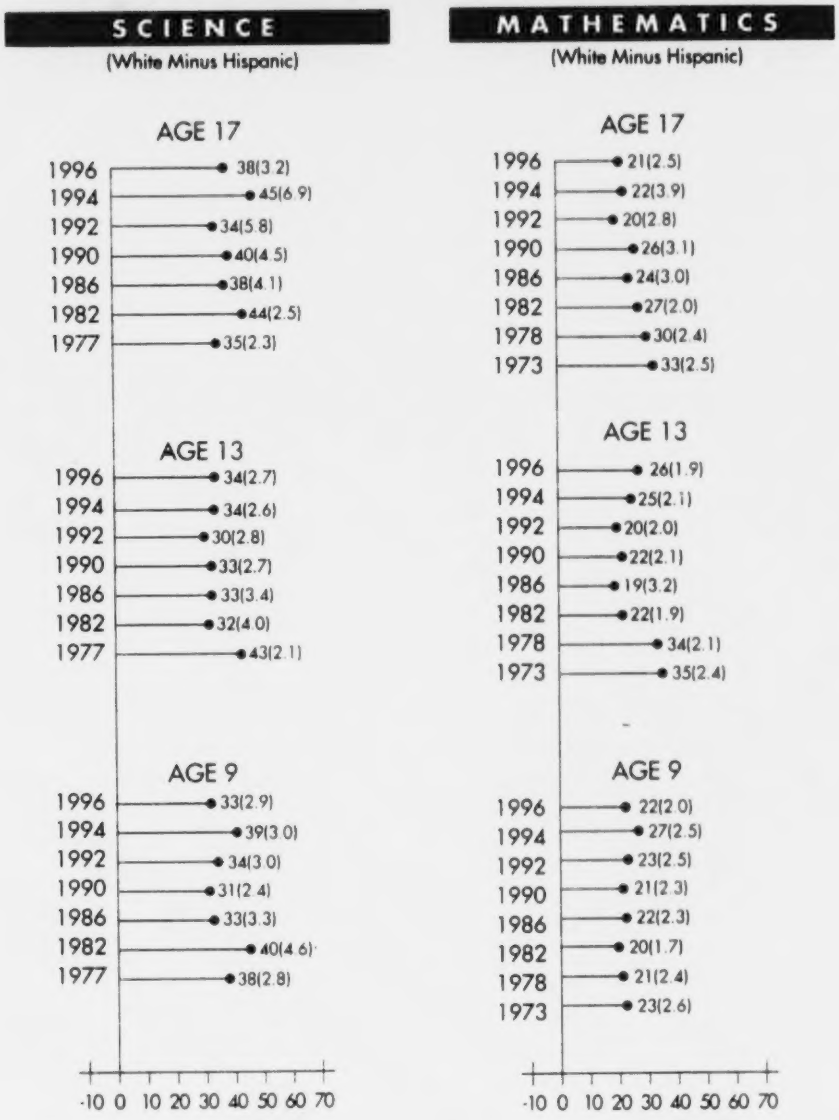

	*	‡	L	Q
Age 17				
Age 13				+
Age 9				

	*	‡	L	Q
Age 17	–		–	
Age 13	–		–	+
Age 9				

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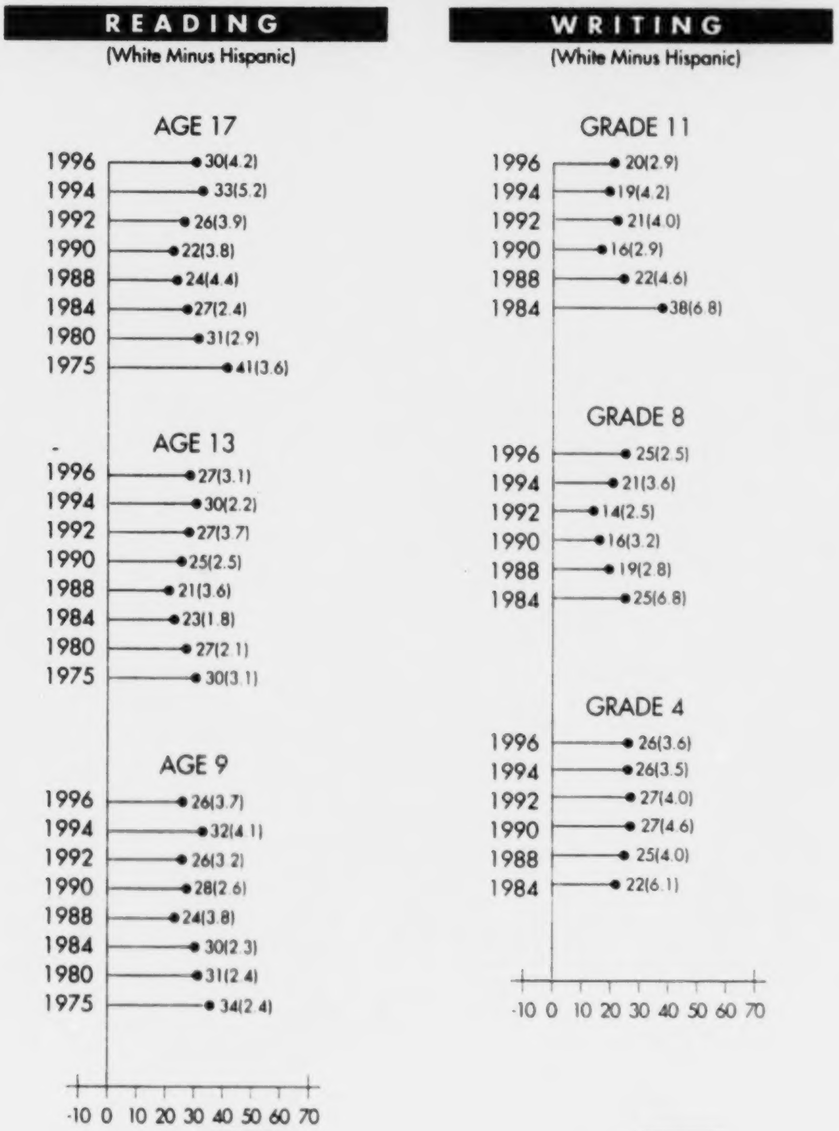
Figure 3 (continued)

Trends in Differences in Average Scale Scores
White vs. Hispanic Students



	*	‡	L	Q
Age 17				+
Age 13				
Age 9				

	*	‡	L	Q
Grade 11				
Grade 8				
Grade 4				

Standard errors of the estimated scale score differences appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in the first assessment year.

‡ Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Differences between Males and Females. In 1996, the differences between average scores of male and female students varied across the four subject areas. In mathematics, male students outperformed female students in each age group. In science average scores for males students were higher than those for female students at ages 13 and 17, but there was no significant difference at age 9. In reading and writing, the results were reverse, with female students outperforming male students at each age or grade level. Some changes were observed across the assessment years in the performance differences between males and females in science, mathematics, and reading. However, the trend in writing scale score gaps demonstrates no consistent pattern of increases or decreases at any grade level.

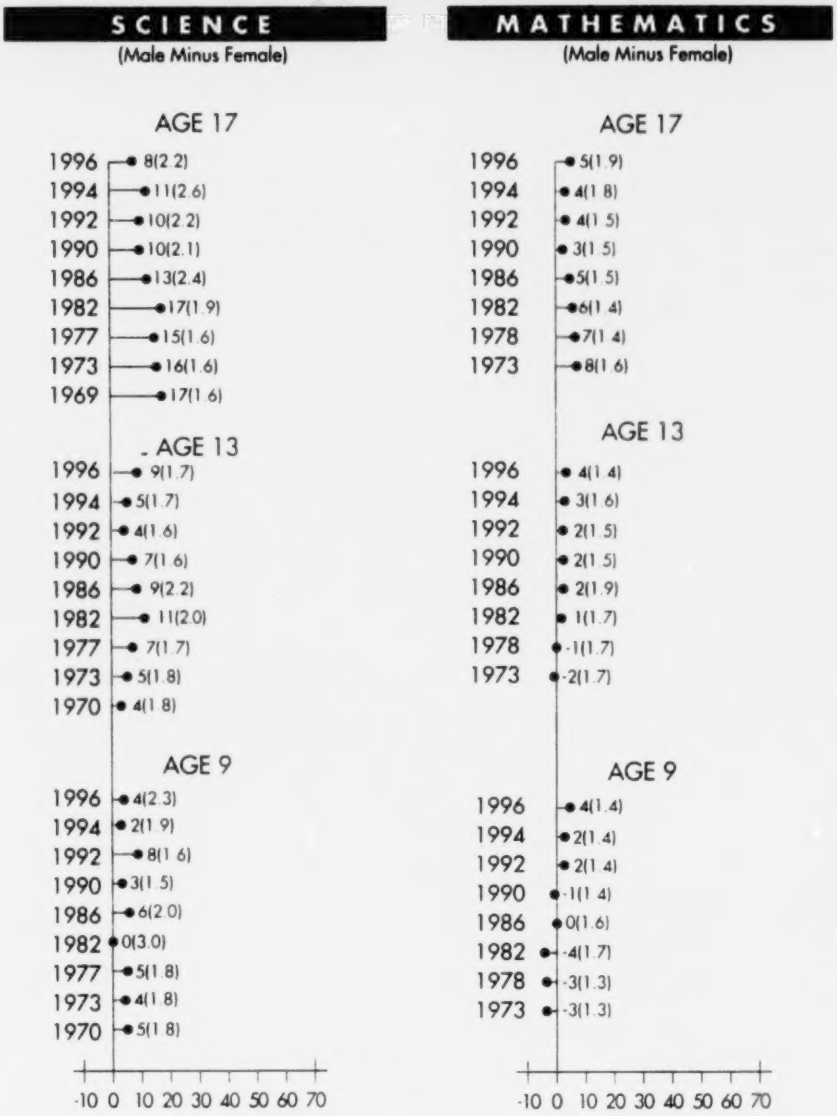
In science, the overall trend at age 17 was one of narrowing gaps between male and female students, due primarily to a decrease that occurred after 1982. As a result, the gap in 1996 was smaller than that in 1969. At age 13, the gap in science scores widened from 1970 to 1982, narrowed again until 1992, but appears to have widened somewhat in the last two assessments. Despite these fluctuations, the gap in 1996 was not significantly different from that in 1970.

In mathematics, the trend at age 17 was toward smaller gaps across the assessments. However, in 1996 the gap between male and female 17-year-olds was not significantly different from that in 1973. Results across the assessment years for 9- and 13-year-olds in mathematics reveal a small but significant shift in the pattern of score differences between male and female students. At both ages, the trend has been away from higher average scores for female students toward higher average scores for male students.

In reading, the gaps between male and female students aged 13 and 17 narrowed between 1975 and 1980, but have fluctuated or increased somewhat since that time. In 1996, the scale score gap for both age groups was not significantly different from that in 1971.

Figure 4

Trends in Differences in Average Scale Scores
Male vs. Female Students

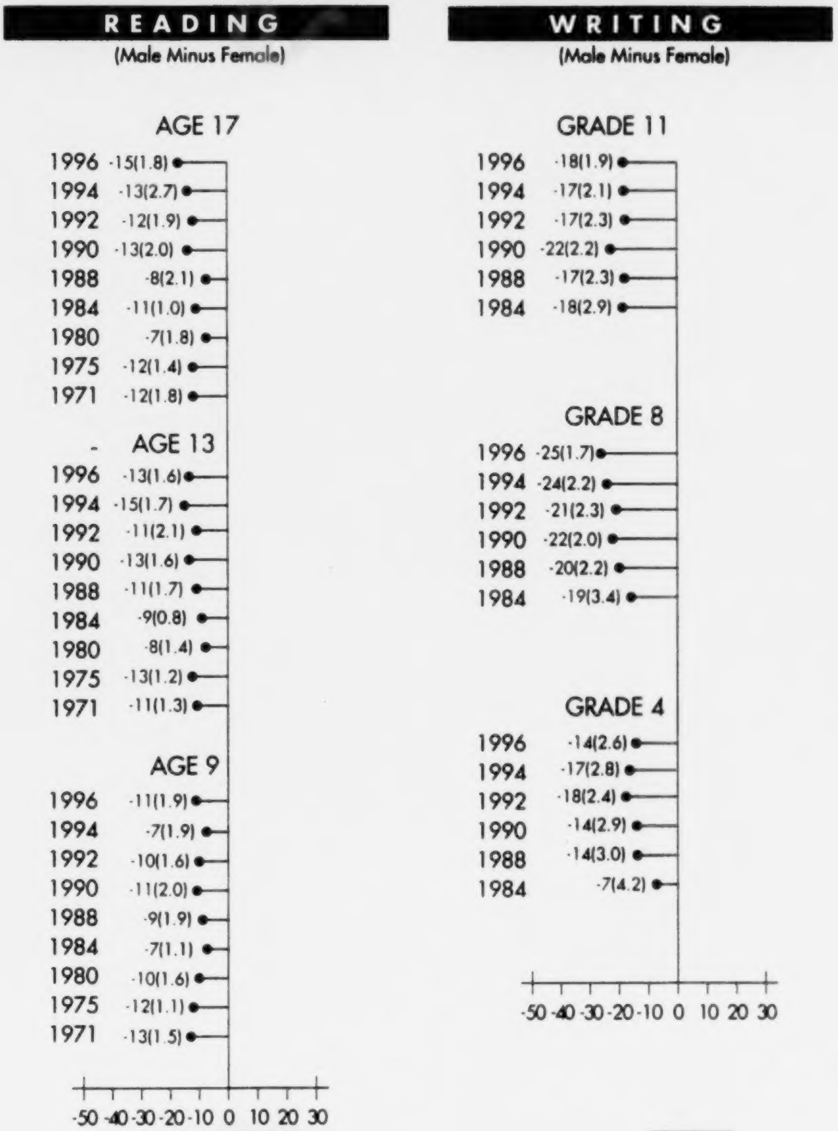


	*	‡	L	Q
Age 17	–		–	
Age 13				–
Age 9				

	*	‡	L	Q
Age 17			–	
Age 13	+		+	
Age 9	+		+	

Figure 4 (continued)

Trends in Differences in Average Scale Scores
Male vs. Female Students



	*	‡	L	Q
Age 17				–
Age 13				–
Age 9				

	*	‡	L	Q
Grade 11				
Grade 8				
Grade 4				

Standard errors of the estimated scale score differences appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in the first assessment year.

‡ Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Students' Experiences Related to Academic Progress

Students' reports about their school and home experiences related to their learning in the different subject areas provide an important context for understanding trends in academic progress over time. Across the assessment years, NAEP has asked students about these relevant experiences and has examined the relationships between students' reports and their average scale scores. For each school and home factor presented in this report, results from the 1996 assessment are compared with results from the first assessment in which information on that contextual variable was collected.

Science and Mathematics Course Work. The percentages of 13- and 17-year-old students taking more challenging course work in science and mathematics increased over time, although the percentages of students taking the most advanced course work continue to be low.[5] Seventeen-year-old students assessed in 1996 were more likely than those in 1986 to report that they had taken biology and chemistry. However, there was no significant change between the two assessments in the percentage of students who reported taking physics.

Compared to 1986, a higher percentage of 13-year-olds in 1996 reported taking prealgebra and a lower percentage reported taking regular math. As shown in Table 5, there were increases between 1978 and 1996 in the percentages of 17-year-olds who reported that their highest level mathematics course was Algebra II or Precalculus/Calculus. Correspondingly, the percentages of students who reported that their highest level course was either General Mathematics/Prealgebra or Algebra I was lower in 1996 than in 1978.

Table 5 Highest Level of Mathematics Course Work, Age 17, 1978 and 1996

	Percentage of Students				
	General Mathematics or Prealgebra	**Algebra 1**	**Geometry**	**Algebra II**	**Precalculus or Calculus**
1996	8 (0.6) *	12 (1.0) *	16 (1.0)	50 (1.6) *	13 (1.1) *
1978	20 (1.0)	17 (0.6)	16 (0.6)	37 (1.2)	6 (0.4)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1978.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[5] A fuller discussion of science and mathematics course-taking patterns is presented in Chapters 2 and 4.

Technology in the Classroom. Students' reports across the assessment years indicated an increased use of technology. In particular, the use of computers for a variety of classroom activities has risen dramatically.[6] Between 1977 and 1996, there was an increase in the percentage of 9-year-olds who reported using a calculator or thermometer in their classrooms. As shown in Table 6, 13- and 17-year-olds assessed in 1996 were far more likely than those assessed in 1978 to report that they had studied mathematics through computer instruction. Table 6 also reveals increases in the percentages of students in grades 8 and 11 who reported that they had used a computer to write stories or papers. The change in students' use of computers for writing was dramatic — from 15 percent to 91 percent at grade 8, and from 19 percent to 96 percent at grade 11.

Table 6 Computer Usage in Mathematics (Ages 13 and 17) and Writing Instruction (Grades 8 and 11), 1978/1984 and 1996

		Percentage of Students Answering "YES"	
		AGE 13	**AGE 17**
Studied mathematics through computer instruction	1996	54 (1.8) *	42 (2.1) *
	1978	14 (0.9)	12 (1.1)
		GRADE 8	**GRADE 11**
Used a computer to write stories or papers	1996	91 (1.2) *	96 (1.1) *
	1984	15 (3.5)	19 (2.2)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1978 or 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[6] A fuller discussion of technology use in classrooms is presented in Chapters 2, 4, and 8.

Homework. The reports of 13- and 17-year-olds about the amount of time they spent each day on homework did not change significantly between 1984 and 1996; however, some changes did occur at age 9. In 1996, the percentage of 9-year-olds who reported that they did not have homework assigned was lower than the percentage in 1984. Correspondingly, the percentage of 9-year-olds who reported doing less than 1 hour of homework each day increased between 1984 and 1996. However, the percentage of students aged 9 who reported doing more than 2 hours of homework decreased.[7]

Students at all three ages were also asked about the number of pages they read each day in school and for homework. As shown in Table 7, although there were no significant changes in the reports of 17-year-olds, the reports of both 9- and 13-year-old students indicated an increase in the number of pages read each day. Between 1984 and 1996, there was an increase in the percentage of 9-year-olds who reported reading more than 20 pages, and a decrease in the percentage who reported reading 5 or fewer pages. Similarly, the reports of 13-year-olds showed an increase in the percentage of students who read more than 20 pages each day, and a decrease in the percentage who reported reading 6 to 10 pages.

Table 7 Pages Read in School and for Homework Per Day, Ages 9, 13, and 17, 1984 and 1996

		Percentage of Students		
		AGE 9	AGE 13	AGE 17
More than 20 pages	1996	17 (1.0) *	14 (0.7) *	21 (1.1)
	1984	13 (0.4)	11 (0.4)	20 (1.0)
16 to 20 pages	1996	16 (0.9)	13 (0.6)	14 (0.7)
	1984	13 (0.5)	11 (0.2)	14 (0.4)
11 to 15 pages	1996	15 (0.7)	18 (0.8)	18 (0.8)
	1984	14 (0.5)	18 (0.4)	18 (0.3)
6 to 10 pages	1996	25 (1.0)	31 (0.8) *	25 (1.0)
	1984	25 (0.5)	35 (0.5)	26 (0.6)
5 or fewer pages	1996	26 (1.1) *	25 (1.0)	22 (0.8)
	1984	35 (1.0)	27 (0.6)	21 (0.8)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[7] A fuller discussion of time spent on homework is presented in Chapter 6.

Home Experiences Related to Learning. Because students' experiences outside of school may have at least as much influence on their academic progress as their classroom experiences, the NAEP trend background questionnaires include questions about home factors related to learning.[8] At grades 4, 8, and 11, a greater percentage of students in 1996 than in 1984 reported using a computer in their homes. Also, a greater percentage of students in grades 8 and 11 reported writing stories or poems that were not for school work at least once a week. However, a greater percentage of eleventh-grade students reported that other people in their family never or hardly ever wrote letters to relatives or friends. Between 1984 and 1996, there were no significant changes in 13- and 17-year-old students' reports about the frequency of reading done by other people in their homes. At ages 9, 13, and 17, students' reports indicated a decrease between 1971 and 1996 in the number of different types of reading materials in their homes.

Past NAEP assessments have shown a relationship between achievement and both reading for fun and television watching. As shown in Table 8, there was no significant difference between 1984 and 1996 in 9- and 13-year-old students' reports about the amount of time they spent reading for fun. At age 17, there was a decrease in the percentage of students who reported reading for fun daily and an increase in the percentage who reported that they never read for fun.

Table 8

Reading for Fun, Ages 9, 13, and 17, 1984 and 1996

		Percentage of Students		
		AGE 9	AGE 13	AGE 17
Daily	1996	54 (1.9)	32 (1.9)	23 (2.0) *
	1984	53 (1.0)	35 (1.0)	31 (0.8)
Weekly	1996	27 (1.8)	31 (2.1)	32 (2.7)
	1984	28 (0.8)	35 (1.2)	34 (1.1)
Monthly	1996	8 (1.0)	15 (1.4)	17 (1.5)
	1984	7 (0.6)	14 (0.8)	17 (0.5)
Yearly	1996	3 (0.5)	9 (1.2)	12 (1.6)
	1984	3 (0.3)	7 (0.5)	10 (0.5)
Never	1996	8 (0.8)	13 (1.5)	16 (2.1) *
	1984	9 (0.5)	9 (0.6)	9 (0.6)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[8] A fuller discussion of home factors related to learning is presented in Chapters 6 and 8.

Students' responses to a question about the amount of time they spend watching television each day show mixed results across the three ages. As shown in Table 9, a greater percentage of 9-year-olds in 1996 than in 1982 reported watching 3 to 5 hours of television every day and a lower percentage reported watching 6 or more hours every day. Although the difference was not significant, the percentage of students who reported watching television for 2 hours or less appeared to increase. These findings suggest that 9-year-olds in 1996 were spending slightly less time watching television than were their counterparts in 1982. The percentage of 13-year-olds who reported watching television 2 hours or less each day decreased, while the percentage who reported watching 3 to 5 hours increased. However, there was a drop in the percentage of 13-year-olds who reported watching 6 or more hours of television. The trend toward increased television watching is more apparent among 17-year-olds. As compared to 1978, a greater percentage of 17-year-old students in 1996 reported watching 3 hours or more of television each day, while a lower percentage reported watching 2 hours or less of television.

Table 9

Television Watching, Ages 9, 13, and 17, 1978/1982 and 1996

THE NATION'S REPORT CARD

		Percentage of Students		
		NUMBER OF HOURS WATCHED PER DAY		
		0-2 Hours	3-5 Hours	6 or More Hours
Age 9	1996	47 (1.1)	36 (1.0) *	18 (0.9) *
	1982	44 (1.1)	29 (0.6)	26 (1.0)
Age 13	1996	39 (1.2) *	48 (0.9) *	13 (0.6) *
	1982	45 (0.8)	39 (0.4)	16 (0.8)
Age 17	1996	54 (1.2) *	39 (1.1) *	7 (0.5) *
	1978	69 (0.7)	26 (0.6)	5 (0.2)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1978 or 1982.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

This Report

A primary purpose of the National Assessment of Educational Progress is to measure trends in academic performance across time. This report, *NAEP 1996 Trends in Academic Progress*, provides a broad examination of students' learning in four core academic areas: science, mathematics, reading, and writing. In addition to overall results, an extensive discussion of the performance of subgroups of students is provided (e.g., racial/ethnic subgroups, males and females). Relevant aspects of students' performance and of home and school factors related to achievement are presented as well.

This report contains six sections. The first four sections correspond to the four subject areas assessed. The first chapter in each subject area section presents overall scale score results for the nation and for subgroups of students, as well as students' attainment of specific performance levels on the NAEP scale. The second chapter in each subject area section discusses students' reports of home and school experiences related to performance. Finally, the report concludes with a Procedural Appendix and a Data Appendix.

Part I

Science

Introduction

The current emphasis on science reform in the United States is rooted in the report *A Nation at Risk*, issued in 1983 by the National Commission on Excellence in Education.[1] This and other reports published in the 1980s pointed out the deficiencies of the educational system and proposed ways to address them, fueling interest in reform.[2] Since then, governmental, professional, and private organizations have all played a role in subsequent reform efforts at state and local levels.[3] Areas of interest include the development of standards, revision of curricula, development of appropriate assessment techniques, and professional development. Several organizations have worked closely with the authors of the National Science Education Standards[4] and published documents to help teachers interpret these standards.[5]

To help policy makers and educators assess the outcomes of their pursuit of excellence in science learning, it is important to find out what American students know and can do in science. The National Assessment of Educational Progress (NAEP) plays a central role in this undertaking. Over the past 27 years, NAEP has administered nine long-term trend assessments to monitor progress in the science performance of 9-, 13-, and 17-year-old students. In addition, the long-term trend assessments included questions about students' experiences related to learning science. These assessments were administered in 1969-70, 1972-73, 1976-77, 1981-82, 1985-86, 1989-90, 1991-92, 1993-94, and 1995-96. The subsequent text refers to each assessment by the last half of the school year in which it was administered: 1969 or 1970, 1973, 1977, 1982, 1986, 1990, 1992, 1994, and 1996. It should be noted that some of the analyses reported in this section do not go back to the first science trend assessment because the data are not available.

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[1] National Commission on Excellence on Education (1983). *A nation at risk: The imperative for education reform.* Washington, DC.

[2] Commission on Precollege Education in Mathematics, Science, and Technology (1983). *Educating Americans for the 21st century: A report to the American people and the National Science Board.* Washington, DC: National Science Board.

[3] The National Science Foundation (1995/1996). *Statewide systemic initiatives in science, mathematics, and engineering.* Arlington, VA.

National Science Teachers Association (1995). *Scope, sequence, and coordination of high school science.* Washington, DC.

Project 2061 (1993). *Benchmarks for science literacy.* Washington, DC: American Association for the Advancement of Science.

National Center on Education and the Economy (1993). *New standards project.* Washington, DC.

[4] National Research Council (1995). *National science education standards.* Washington, DC.

[5] National Science Teachers Association (1995). *A high school framework for national science education standards.* Arlington, VA.

The NAEP Long-Term Trend Science Assessment

In addition to the long-term trend assessment, NAEP conducted a 1996 survey of science achievement among students in grades 4, 8, and 12. To keep abreast of current pedagogical research, this most recent "main" NAEP science assessment included performance tasks such as hands-on investigations and constructed-response questions, as well as multiple-choice questions. Results from the 1996 main NAEP science assessment are presented in a separate report.[6]

Two important features distinguish the long-term trend assessment in science from the main NAEP science assessment: sampling procedures and instrumentation. Data collection for the main NAEP science assessment conducted in 1996 involved national samples of students in grades 4, 8, and 12, and state samples of students in grade 8. In contrast, the long-term trend assessment conducted in 1996 sampled students from across the country at ages 9, 13, and 17. Another important difference between the 1996 main NAEP science assessment and the long-term trend assessment in science was the sets of questions administered. To allow for measuring trends in achievement since the first long-term trend assessment in science, the administration procedures and assessment content were replicated in each trend assessment, including 1996. While the new instrument developed for the 1996 main NAEP assessment placed particular emphasis on constructed-response questions and performance tasks, the long-term trend assessment contains only multiple-choice questions.

Although the main NAEP assessments in each subject area are changed periodically to reflect contemporary educational goals and curriculum content (e.g., the 1996 main NAEP science assessment), the long-term trend science assessment reflects educational objectives that were established in 1969 for 17-year-olds and 1970 for 9- and 13-year-olds. As such, the long-term trend assessment may represent a more constrained view of science in comparison to that of the main science assessment conducted in 1996. The long-term trend assessment in science contains a content dimension and a cognitive dimension.[7] The content dimension assesses life science, physical science, and earth and space science. The cognitive dimension assesses students' ability to conduct inquiries, solve problems, and know science. NAEP also assesses students' understanding of the nature of science within the context of both content area knowledge and cognition. In contrast, the framework for the 1996 main NAEP science assessment specified that students not only be assessed in different areas of science, but also with interdisciplinary exercises that merge technology with the science content areas. Furthermore, the 1996 main assessment included blocks of questions organized around themes that constitute major, interdisciplinary organizing principles of science: models, systems, and patterns of change.[8]

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[6] O'Sullivan, C. Y., Reese, C. M., and Mazzeo, J. (1997). *NAEP 1996 science report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[7] National Assessment of Educational Progress (1986). *Science objectives: 1985-1986 assessment.* Princeton, NJ.

National Assessment of Educational Progress (1989). *Science objectives: 1990 assessment.* Princeton, NJ.

[8] National Assessment Governing Board (1996). *Science framework for the 1996 National Assessment of Educational Progress.* Washington, DC.

Because of the differences in sampling procedures and assessment content, results from the 1996 main and state NAEP science assessments are not directly comparable to those from the 1996 long-term trend assessment in science. However, results from the trend assessments can provide valuable information about the attainment of long-held educational goals during a time of change and reform. For example, while school curricula shift toward increased emphasis on the application of science knowledge and the ability to communicate scientific concepts, long-term trend results indicate whether students are maintaining their grasp of basic science knowledge and skills. Long-term trend assessments also examine whether current students have greater knowledge of science than did their peers of one and two decades ago.

Analysis Procedures

Estimates of average student performance in the long-term trend assessments were calculated using analysis techniques based on item response theory (IRT). The resultant scale, which spans 0 to 500, allows for comparisons of average scores across assessments, age groups, and demographic subpopulations. (The Procedural Appendix contains more detailed explanations of the analysis procedures and definitions of student subpopulations.) Five different levels of science performance have been defined on the NAEP trend scale:

Level 150 – Knows Everyday Science Facts;

Level 200 – Understands Simple Scientific Principles;

Level 250 – Applies General Scientific Information;

Level 300 – Analyzes Scientific Procedures and Data; and

Level 350 – Integrates Specialized Scientific Information.

NAEP reports the performance of groups and subgroups of students, not individuals. Two measures of performance are used in this section: the average scores of groups of students on the NAEP science scale, and the percentages of students within each group attaining each of the five performance levels. Because the average scale scores and the percentages are based on samples of students and are subject to sampling and measurement error, standard errors are included with the results presented here.

In the tables and figures that present science trend results, the 1996 assessment was statistically compared to two previous assessments: the prior assessment in 1994, and the first assessment which provided sufficient data on the variables being tested (i.e., the base year). The purpose of year-to-year statistical tests was to determine whether the results in the 1996 assessment were different from the results of the previous assessment or whether any changes had taken place since the base year assessment. Tests of other year-to-year comparisons can be found in previous reports of NAEP long-term trend assessments.

In addition to comparisons between individual assessment years, a second test of significance was conducted to detect statistically significant linear and quadratic trends across assessments. (See the Procedural Appendix for a discussion of the procedure.) This type of analysis makes it possible to discuss statistically significant patterns that may be missed by year-to-year comparisons. For example, from assessment to assessment, students' average scale scores may consistently increase (or decrease) by a small amount. Although these small increases (or decreases) between years may not be statistically significant under pairwise multiple comparisons, the overall increasing (or decreasing) trend in average scores may be statistically significant and noteworthy. The purpose of trend tests is to determine whether the results of the series of assessments could be generally characterized by a line or a simple curve. A linear trend tests for cumulative change over the entire assessment period, such as an increase or decrease at a relatively constant rate. Simple curvilinear (i.e., quadratic) relationships represent more complex patterns. Two examples of such patterns include initial score declines over part of the time period followed by subsequent increases in more recent assessments, or a pattern of initial score increases over a time period followed by a period of relatively stable performance.

This Section

The two chapters in Part I concentrate on different aspects of student performance. Trends in average science scale scores for the nation and demographic subpopulations are reported in Chapter 1. Also included are definitions of levels of science performance and information on the percentages of students attaining successive levels in each assessment. Chapter 2 summarizes trends in students' responses to questions about participation in science activities, course taking, and other student behaviors and attitudes.

In Chapter 1, the results of statistical tests conducted to determine significant differences between 1996 and the first assessment year, and between 1996 and 1994, are indicated in grids that appear next to or below the figures and tables. The results from tests comparing the base year and 1996 assessments are summarized in the column labeled with the asterisk symbol "*." Significant differences are denoted with a "+" or "-" sign indicating that the 1996 average score was either greater than or less than the base year score, respectively. Similarly, significant differences between 1994 and 1996 assessment results are denoted with a "+" or "-" sign under the column labeled with the dagger symbol "‡" indicating that the 1996 average score was either greater or smaller than the 1994 average, respectively. The results from the linear and quadratic trend tests are summarized in the columns labeled "L" and "Q," respectively. Within each column, significant positive trends are denoted by a "+" sign and significant negative trends are denoted with a "-" sign. In Chapter 2, where only the first and most recent assessment results are presented, significant differences between the base year and 1996 are indicated within the tables. All of the differences and trend patterns discussed in this report are statistically significant at the .05 level.

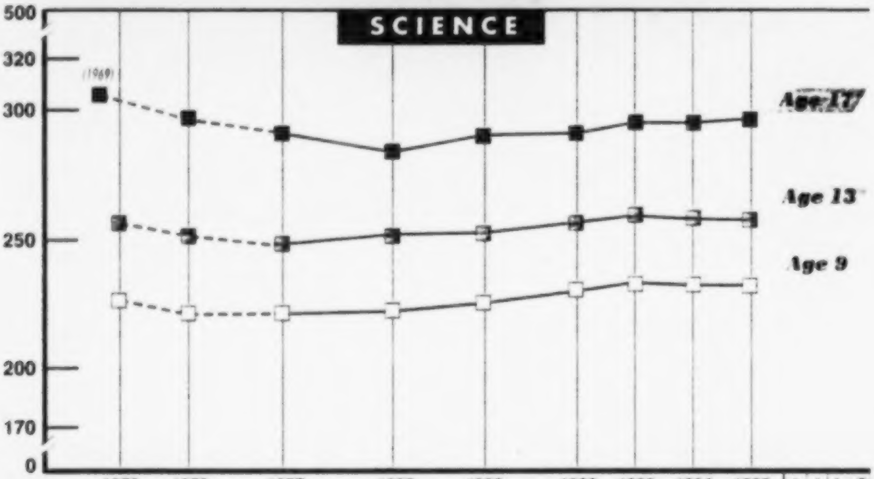
Chapter 1

Science Scores for the Nation and Selected Subpopulations

Results for the Nation from 1969-70 to 1996

Figure 1.1 depicts trends in average science scores for 9-, 13-, and 17-year-old students from 1969 to 1996. The results for 1969 (17-year-olds only), 1970 (9- and 13-year-olds), and 1973 (all age groups) are extrapolated from previous analyses of NAEP data and are represented by dotted lines. Results for the 1977, 1982, 1986, 1990, 1992, 1994, and 1996 assessments are based on more recent analyses and are represented by solid lines. (Refer to the Procedural Appendix for details of scaling methodology and information about drawing inferences from trend analyses.)

Figure 1.1 Trends in Average Science Scale Scores for the Nation, 1969-70 to 1996



	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	305 (1.0)	296 (1.0)	290 (1.0)	283 (1.2)	289 (1.4)	290 (1.1)	294 (1.3)	294 (1.6)	296 (1.2)	–		–	+
Age 13	255 (1.1)	250 (1.1)	247 (1.1)	250 (1.3)	251 (1.4)	255 (0.9)	258 (0.8)	257 (1.0)	256 (1.0)			+	+
Age 9	225 (1.2)	220 (1.2)	220 (1.2)	221 (1.8)	224 (1.2)	229 (0.8)	231 (1.0)	231 (1.2)	230 (1.2)	+		+	+

Standard errors of the estimated scale scores appear in parentheses. [– – –] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1969-70.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Seventeen-year-olds. The performance of 17-year-old students dropped from 1969 to 1982. Although performance has improved since that time, the overall trend was one of decreased performance. The average score in 1996 was not significantly different from the average in 1994, but was below the 1969 average.

Thirteen-year-olds. The average score of 13-year-olds declined during the 1970s, but has increased since then. Despite an overall pattern of improved performance, the average score in 1996 did not differ significantly from that in 1994 or in 1970.

Nine-year-olds. During the early 1970s, the average science scores of 9-year-olds declined. Since 1982, however, the performance of this age group has improved, and the overall pattern was one of increasing scores. Although there was no significant increase from 1994 to 1996, the average score for 9-year-olds was higher in 1996 than in 1970.

National Trends in Levels of Science Performance from 1977 to 1996

To provide more information about students' knowledge and skills in science, five levels of performance were established on the science trend scale: 150, 200, 250, 300, and 350 (see Procedural Appendix for details).[9] Performance was "anchored" at the five levels by using empirical procedures that identified sets of assessment questions that students who performed at one level were more likely to answer correctly than students who performed at the next lower level. The types of knowledge and skills that these sets of questions assessed were then identified and used as a basis for constructing descriptions of performance at the five scale levels. Figure 1.2 provides these descriptions for the five anchor levels.

Figure 1.2 Levels of Science Performance

Level 350:

Integrates Specialized Scientific Information

Students at this level can infer relationships and draw conclusions using detailed scientific knowledge from the physical sciences, particularly chemistry. They also can apply basic principles of genetics and interpret the social implications of research in this field.

Level 300:

Analyzes Scientific Procedures and Data

Students at this level can evaluate the appropriateness of the design of an experiment. They have more detailed scientific knowledge and the skill to apply their knowledge in interpreting information from text and graphs. These students also exhibit a growing understanding of principles from the physical sciences.

Level 250:

Applies General Scientific Information

Students at this level can interpret data from simple tables and make inferences about the outcomes of experimental procedures. They exhibit knowledge and understanding of the life sciences, including a familiarity with some aspects of animal behavior and of ecological relationships. These students also demonstrate some knowledge of basic information from the physical sciences.

Level 200:

Understands Simple Scientific Principles

Students at this level are developing some understanding of simple scientific principles, particularly in the life sciences. For example, they exhibit some rudimentary knowledge of the structure and function of plants and animals.

Level 150:

Knows Everyday Science Facts

Students at this level know some general scientific facts of the type that could be learned from everyday experiences. They can read simple graphs, match the distinguishing characteristics of animals, and predict the operation of familiar apparatuses that work according to mechanical principles.

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[9] In theory, performance levels above 350 and below 150 could have been defined; however, so few students in the assessment performed at the extreme ends of the science scale that it was not practical to do so.

Table 1.1 presents the percentages of students performing at or above the five science performance levels in the seven assessments conducted since 1977.[10] (Performance level data are not available for assessment years with extrapolated results.) The results for each performance level are discussed separately. Data on performance levels by gender, race/ethnicity, modal grade, region, parents' education level, type of school, and quartiles can be found in the Data Appendix.

Table 1.1 Trends in Percentage of Students At or Above Five Science Performance Levels, 1977 to 1996

		Assessment Years										
Performance Levels	**Age**	**1977**	**1982**	**1986**	**1990**	**1992**	**1994**	**1996**	*****	**‡**	**L**	**Q**
Level 350 **Integrates Specialized Scientific Information**	9	0 (0.0)	0 (***)	0 (***)	0 (0.0)	0 (***)	0 (0.0)	0 (0.1)				
	13	1 (0.1)	0 (0.1)	0 (0.1)	0 (0.1)	0 (0.1)	0 (0.1)	0 (0.2)				
	17	9 (0.4)	7 (0.4)	8 (0.7)	9 (0.5)	10 (0.7)	10 (0.8)	11 (0.9)	+		+	+
Level 300 **Analyzes Scientific Procedures and Data**	9	3 (0.3)	2 (0.7)	3 (0.5)	3 (0.3)	3 (0.3)	4 (0.4)	4 (0.5)	+		+	+
	13	11 (0.5)	10 (0.7)	9 (0.9)	11 (0.6)	12 (0.8)	12 (0.9)	12 (0.6)			+	+
	17	42 (0.9)	37 (0.9)	41 (1.4)	43 (1.3)	47 (1.5)	48 (1.3)	49 (1.3)	+		+	+
Level 250 **Applies General Scientific Information**	9	26 (0.7)	24 (1.8)	28 (1.4)	31 (0.8)	33 (1.0)	34 (1.2)	32 (1.2)	+		+	
	13	49 (1.1)	51 (1.6)	53 (1.6)	57 (1.0)	61 (1.1)	60 (1.1)	58 (1.2)	+		+	
	17	82 (0.7)	77 (1.0)	81 (1.3)	81 (0.9)	83 (1.2)	83 (1.2)	84 (0.9)			+	+
Level 200 **Understands Simple Scientific Principles**	9	68 (1.1)	71 (1.9)	72 (1.1)	76 (0.9)	78 (1.2)	77 (1.0)	76 (1.0)	+		+	
	13	86 (0.7)	90 (0.8)	92 (1.0)	92 (0.7)	93 (0.5)	92 (0.6)	92 (0.6)	+		+	–
	17	97 (0.2)	96 (0.5)	97 (0.5)	97 (0.3)	98 (0.5)	97 (0.7)	98 (0.3)			+	
Level 150 **Knows Everyday Science Facts**	9	94 (0.6)	95 (0.7)	96 (0.3)	97 (0.3)	97 (0.3)	97 (0.4)	97 (0.5)	+		+	–
	13	99 (0.2)	100 (0.1)	100 (0.1)	100 (0.1)	100 (0.1)	100 (0.1)	100 (0.1)	+		+	–
	17	100 (0.0)	100 (0.1)	100 (***)	100 (***)	100 (***)	100 (0.1)	100 (***)				

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[10] The performance levels are based upon a vertical scale that assumes knowledge is cumulative. Younger students are not expected to have the same amount of knowledge as older students. Therefore, most 9-year-olds are not expected to reach the upper levels of performance.

Level 350: After a slight decline in the early 1980s, there was an increase in the percentage of 17-year-olds who were able to integrate specialized scientific information, and the overall trend was one of increased percentages. The percentage of 17-year-olds who attained this highest performance level in 1996 was higher than that in 1977. Less than one percent of 9- and 13-year-olds attained this level in 1996.

Level 300: Students' performance at this level was characterized by the ability to analyze scientific procedures and data. For all three age groups, there was evidence of early declines followed by increases in the percentage of students reaching this level. The overall pattern was one of increased percentages of students in each age group attaining at least this level. The percentage of 17-year-old students at this performance level was higher in 1996 than in 1977, but there was no significant difference for the 13-year-olds. Although the difference is small, a significantly higher percentage of 9-year-olds attained this level in 1996 than in 1977.

Level 250: After a decline between 1977 and 1982, the percentage of 17-year-olds able to apply general scientific information increased, and the overall trend was positive. However, the 1996 percentage did not differ significantly from that in 1977. For both 9- and 13-year-olds, the overall trend showed improvement across the assessments, and the 1996 percentage of students at or above this level was higher than the 1977 percentage.

Level 200: In 1996, as in earlier assessment years, most 17-year-olds performed at or above this level, demonstrating understanding of simple scientific principles. The percentage of 13-year-olds reaching this level increased between 1977 and 1986 and has been stable since that time. Among 9-year-olds, an overall pattern of increase was observed in the percentage of students reaching this level. For both 9- and 13-year-olds, the percentage of students at or above this level in 1996 was significantly higher than in 1977.

Level 150: In 1996, nearly all students at all three ages demonstrated knowledge of everyday science facts and an ability to perform tasks at this most basic level. At ages 9 and 13, an increase between 1977 and 1996 was observed in the percentage of students attaining at least this level of performance.

Trends in Science Scale Scores by Quartile from 1977 to 1996

Figure 1.3 depicts the average science scale scores of 9-, 13-, and 17-year-old students who were in the upper quartile (upper 25 percent), middle two quartiles (middle 50 percent), and the lower quartile (lower 25 percent) of student performance in each assessment. As would be expected, standard errors are somewhat smaller for these more homogeneous groups than for the total group. (Please note that these trends are not extrapolated back to 1969 or 1970.)

Analyses by quartiles provide information on trends in science scores for students who are at the upper as well as lower points of the distribution of scores. This demonstrates whether overall gains or losses were evident across the full range of performance in science, or whether the results were particular to certain achievement groups. This information is especially relevant in light of one objective of Goal 3 of The National Education Goals, which states that "the academic performance of elementary and secondary students will increase significantly in every quartile . . ."[11], emphasizing that students of all abilities should be granted access to educational opportunities and should demonstrate gains in educational achievement.

For 17-year-olds in the upper quartile, a positive linear trend indicated an overall pattern of increasing scores from 1977 to 1996. For 17-year-olds in the middle two quartiles, average scores decreased between 1977 and 1982 and then increased, resulting in an overall pattern of improved performance. For both quartile groups, average scores in 1996 were higher than those in 1977. The average score of 17-year-olds in the lower quartile declined after the 1977 assessment, and then changed little until 1992 when it recovered slightly. The average score in 1996, however, was not significantly different from that in 1977. Among 13-year-olds in each quartile group, an overall pattern of increasing scores was observed. For students in the lower quartile, an increase in scores from 1977 to 1992 was followed by stable performance. In all three performance groups, the average scores for 13-year-olds were higher in 1996 than in 1977. The average scores of 9-year-olds in each performance range showed an overall pattern of increases across the assessment years. For all three quartile groups, average scores in 1996 were significantly higher than scores in 1977.

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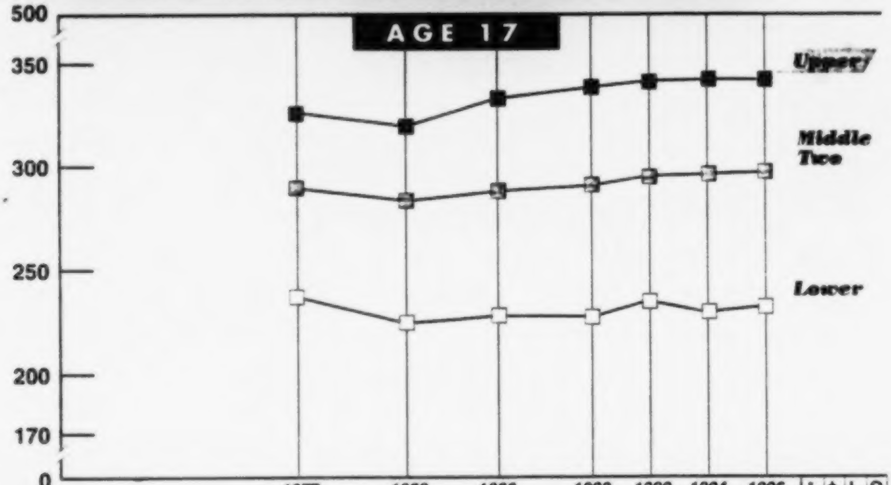
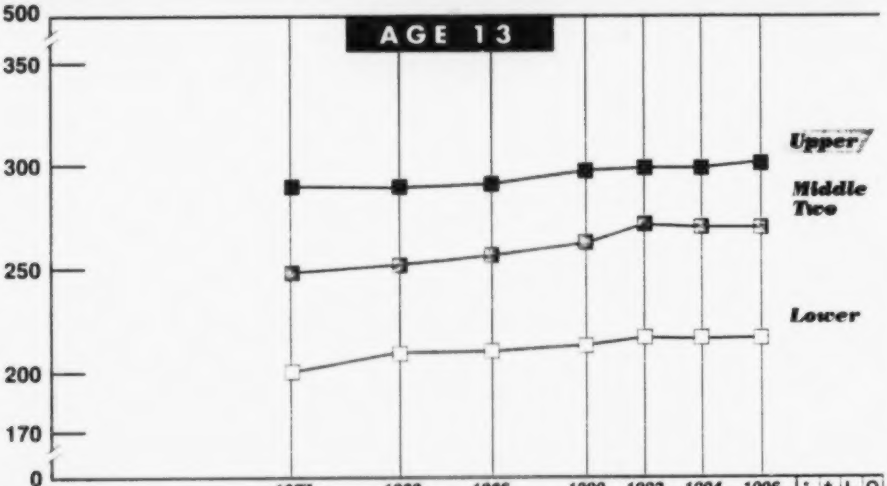
[11] National Education Goals Panel (1996). *The national education goals report: Building a nation of learners.* Washington, DC: U. S. Government Printing Office.

Figure 1.3

Trends in Average Science Scale Scores by Quartile, 1977 to 1996



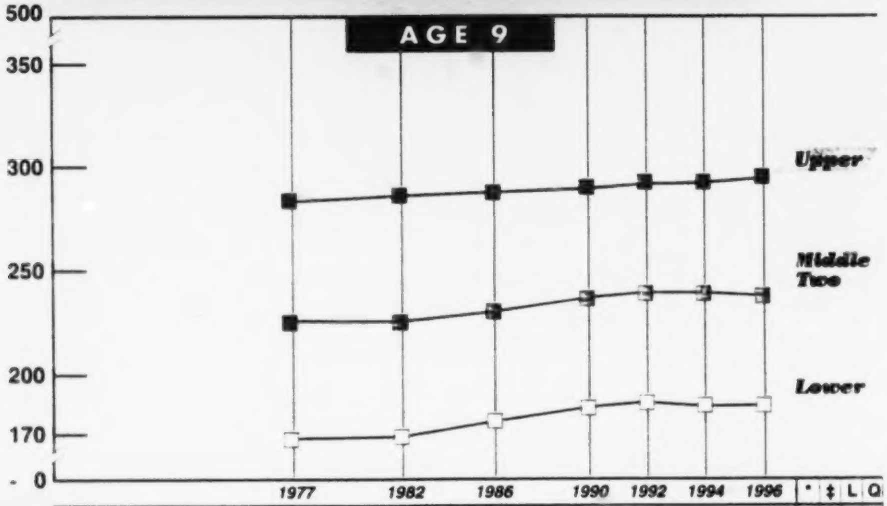
	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	334 (0.9)	329 (1.0)	340 (1.1)	344 (0.7)	346 (0.7)	347 (0.9)	347 (1.6)	+		+	
Middle Two	291 (0.5)	286 (0.7)	290 (0.7)	292 (0.7)	295 (1.0)	296 (0.7)	297 (0.9)	+		+	+
Lower Quartile	242 (0.8)	232 (1.3)	235 (1.3)	234 (1.2)	240 (1.9)	236 (1.7)	238 (1.4)				+



	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	291(0.5)	291(0.9)	292(1.1)	297(0.7)	298(1.0)	298(1.2)	300(1.1)	+		+	
Middle Two	249(0.6)	251(0.6)	252(0.7)	256(0.6)	260(0.5)	259(0.7)	259(0.6)	+		+	
Lower Quartile	201(0.8)	208(0.8)	209(0.9)	211(1.2)	214(0.8)	214(1.3)	214(0.9)	+		+	−

Figure 1.3 (continued)

Trends in Average Science Scale Scores by Quartile, 1977 to 1996



	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	266(0.9)	268(1.8)	269(1.2)	271(0.8)	273(1.2)	273(1.0)	275(1.0)	+		+	
Middle Two	222(0.5)	222(1.1)	226(0.6)	231(0.5)	233(0.7)	233(1.1)	232(1.0)	+		+	
Lower Quartile	170(1.1)	171(2.0)	177(1.0)	182(0.9)	184(1.2)	183(1.2)	183(1.6)	+		+	

Standard errors of the estimated scale scores appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Trends in Science Scale Scores by Race/Ethnicity from 1969-70 to 1996

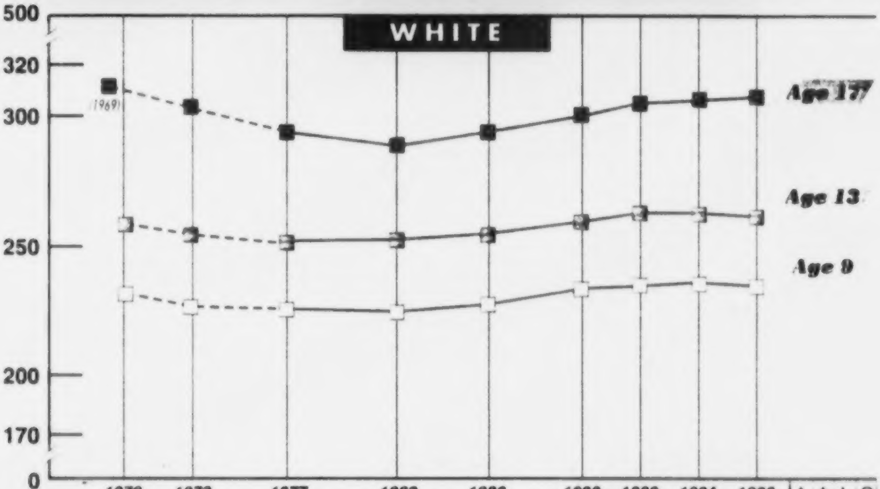
Shown in Figure 1.4 are the trends in average science scale scores for White, Black, and Hispanic students.

White Students. The average scores of White 17-year-olds showed a pattern of decline from 1969 to 1982, followed by a period of improvement. Despite the gains made, the average score for 17-year-olds in 1996 was lower than that in 1969. In general, the overall trends for 9- and 13-year-old White students were characterized by periods of decline during the 1970s followed by recovery periods in the 1980s. Despite the overall pattern of improvement across the assessment years, average scores in 1996 were not significantly different from those in 1970.

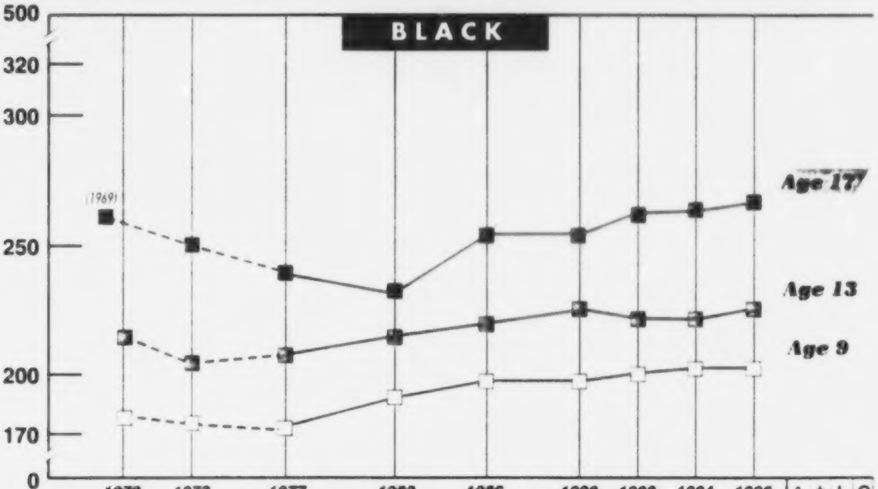
Black Students. Among 17-year-old Black students, a decline in average scores between 1969 and 1982 was followed by an increased performance. Although the overall trend was positive, the average score of these students in 1996 was not significantly different from that of their counterparts in 1969. Despite some fluctuations, the overall trend for Black 9- and 13-year-olds showed a pattern of rising scores between 1970 and 1996. In 1996, the average scores of 9- and 13-year-old students were higher than those in 1970.

Hispanic Students. Despite some fluctuations, the trend for 17-year-olds indicated overall improvement across the assessment years. Nevertheless, no significant difference was found between the 1977 and 1996 average scores of Hispanic 17-year-olds. An overall pattern of improved performance was found for Hispanic 9- and 13-year-old students. (Note that science scale scores were not extrapolated back to 1970 for Hispanic students.) For both age groups, the 1996 average score was higher than the average score in 1977.

Figure 1.4 Trends in Average Science Scale Scores by Race/Ethnicity, 1969-70 to 1996



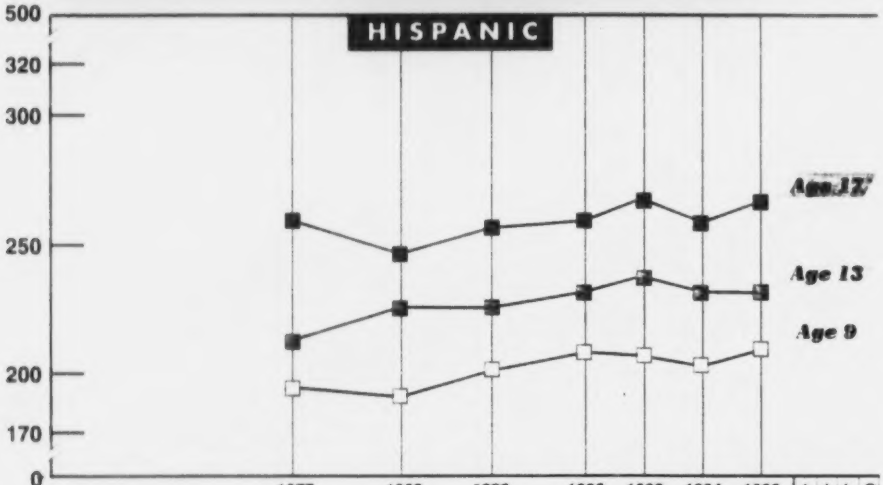
	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	312(0.8) –	304(0.8) –	298(0.7) 83(1.3)	293(1.0) 81(2.0)	298(1.7) 78(0.5)	301(1.1) 73(0.5)	304(1.3) 75(0.5)	306(1.5) 72(0.6)	307(1.2) 71(0.7)	–			+
Age 13	263(0.8) –	259(0.8) –	256(0.8) 80(1.6)	257(1.1) 79(2.1)	259(1.4) 77(1.0)	264(0.9) 73(0.7)	267(1.0) 74(0.5)	267(1.0) 72(0.8)	266(1.2) 71(0.6)			+	+
Age 9	236(0.9) –	231(0.9) –	230(0.9) 80(1.6)	229(1.9) 79(2.6)	232(1.2) 77(1.1)	238(0.8) 75(1.1)	239(1.0) 75(0.9)	240(1.3) 74(0.9)	239(1.4) 72(1.1)			+	+



	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	258(1.5) –	250(1.5) –	240(1.5) 12(1.1)	235(1.7) 13(1.4)	253(2.9) 14(0.3)	253(4.5) 16(0.3)	256(3.2) 15(0.3)	257(3.1) 15(0.3)	260(2.3) 15(0.3)			+	+
Age 13	215(2.4) –	205(2.4) –	208(2.4) 13(1.2)	217(1.3) 14(1.9)	222(2.5) 14(0.9)	226(3.1) 16(0.3)	224(2.7) 16(0.3)	224(4.2) 15(0.3)	226(2.2) 15(0.4)	+		+	
Age 9	179(1.9) –	177(1.9) –	175(1.8) 14(1.4)	187(3.0) 14(2.1)	196(1.9) 15(0.5)	196(2.0) 16(0.7)	200(2.7) 16(0.4)	201(1.7) 15(0.5)	201(2.6) 16(0.5)	+		+	

Figure 1.4
(continued)

Trends in Average Science Scale Scores by Race/Ethnicity, 1969-70 to 1996



	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	262(2.2) 4(0.9)	249(2.3) 5(1.1)	259(3.8) 6(0.3)	262(4.4) 7(0.4)	270(5.6) 7(0.5)	261(6.7) 9(0.3)	269(3.0) 9(0.7)			+	
Age 13	213(1.9) 5(1.1)	226(3.9) 5(1.0)	226(3.1) 7(1.1)	232(2.6) 7(0.5)	238(2.6) 7(0.5)	232(2.4) 8(0.4)	232(2.5) 9(0.7)	+		+	
Age 9	192(2.7) 5(0.9)	189(4.2) 5(1.3)	199(3.1) 6(1.1)	206(2.2) 6(0.6)	205(2.8) 6(0.8)	201(2.7) 6(0.4)	207(2.5) 8(1.0)	+		+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

[– – –] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1969-70 (for White and Black students) or in 1977 (for Hispanic students).

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Trends in Science Scale Scores by Gender from 1969-70 to 1996

Figure 1.5 shows trends in average science scale scores for male and female students at all three ages.

Male Students. Among 17-year-old males, average science scores declined between 1969 and 1982. Although gains have been made since that time, the overall trend was one of decreased performance and the 1996 average score was lower than the 1969 average. Despite an initial period of decline in the 1970s, the performance of 9- and 13-year-old males improved over the assessment years. However, average science scores in 1996 did not differ significantly from those in 1970.

Female Students. From 1969 until 1982, science scores for 17-year-old females declined, then subsequently rose. As with 17-year-old males, however, the 1996 average score for females was still below the average of 27 years earlier. For 9- and 13-year-old female students, trend analyses revealed an overall pattern of improved performance. Among 13-year-olds, declining performance during the 1970s was followed by a recovery period in the 1980s. For 9-year-olds the overall pattern is similar, except that the gains made during the 1980s resulted in an average score in 1996 that was higher than the average in 1970.

Figure 1.5

Trends in Average Science Scale Scores by Gender, 1969-70 to 1996

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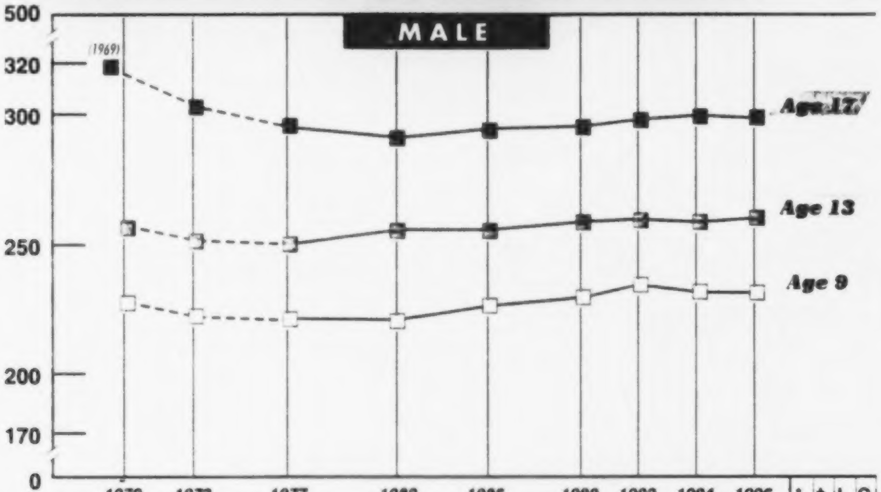
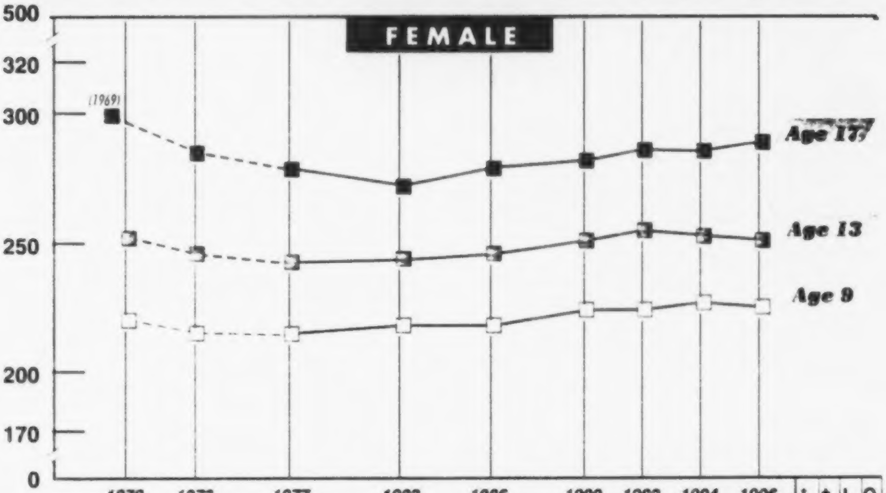


	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	314(1.2) —	304(1.2) —	297(1.2) 50(0.7)	292(1.4) 48(0.7)	295(1.9) 49(1.2)	296(1.3) 49(0.9)	299(1.7) 51(1.2)	300(2.0) 49(1.3)	300(1.7) 50(1.2)	–		–	+
Age 13	257(1.3) —	252(1.3) —	251(1.3) 50(0.3)	256(1.5) 49(0.7)	256(1.6) 50(0.9)	259(1.1) 50(0.6)	260(1.2) 50(0.8)	259(1.2) 49(0.8)	261(1.1) 48(0.8)			+	+
Age 9	228(1.3) —	223(1.3) —	222(1.3) 51(0.4)	221(2.3) 51(0.5)	227(1.4) 50(0.6)	230(1.1) 49(0.6)	235(1.2) 49(0.6)	232(1.3) 49(0.8)	232(1.8) 50(0.6)			+	+



	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	297(1.1) —	288(1.1) —	282(1.1) 51(0.7)	275(1.3) 52(0.7)	282(1.5) 51(1.2)	285(1.6) 51(0.9)	289(1.5) 49(1.2)	289(1.7) 50(1.3)	292(1.4) 50(1.2)	–			+
Age 13	253(1.2) —	247(1.2) —	244(1.2) 50(0.3)	245(1.3) 52(0.7)	247(1.5) 50(0.9)	252(1.1) 50(0.6)	256(1.0) 50(0.8)	254(1.2) 51(0.8)	252(1.3) 52(0.8)			+	+
Age 9	223(1.2) —	218(1.2) —	218(1.2) 49(0.4)	221(2.0) 50(1.5)	221(1.4) 50(0.6)	227(1.0) 51(0.6)	227(1.0) 51(0.6)	230(1.4) 51(0.8)	228(1.4) 50(0.6)	+		+	+

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

[– – –] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1969-70.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Trends in Differences in Average Science Scale Scores by Race/Ethnicity and by Gender

The previous sections discussed trends in science achievement for students of different racial/ethnic and gender groups. NAEP studies, as well as other academic assessments, have commonly found higher average achievement in science for White students compared to their minority peer groups, and for males compared to females.[12] The size of the performance gaps between the groups, and the trends in these differences, are matters of considerable interest. Trends in score differences help shed light on whether the gaps between racial/ethnic and between gender groups are increasing, decreasing, or staying the same over time. As with past NAEP assessments, significant performance differences were observed in the 1996 trend assessment among racial/ethnic subgroups and between males and females. Trends in the differences between the average science scores of selected subgroups of students are displayed in Figure 1.6.

A number of factors should be considered when interpreting achievement differences between subgroups. For example, some research has suggested that many minority students attend schools that limit their "opportunity to learn" by providing substandard physical facilities, fewer academic resources, and less challenging curricula.[13] Others have argued that disproportionate numbers of minority students are placed in low-ability classes that provide them with less intensive curricula.[14] Furthermore, some research points to discrepancies in background characteristics, such as socioeconomic status and home resources, as well as supportive learning environments, to explain differences between the academic achievement of racial/ethnic subgroups.[15] Gender differences in science performance may be related to different course-taking patterns and less favorable attitudes toward science among females.[16] Other research has found that many parents and teachers hold lower expectations for females' success in science classes, and that females are given less encouragement to enroll in advanced science courses, are not called on as frequently in science class, and have fewer female role models.[17]

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[12] Campbell, J. R., Reese, C. M., O'Sullivan, C., & Dossey, J. A. (1996). *NAEP 1994 trends in academic progress.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

Jones, L. R., Mullis, I. V. S., Raizen, S. A., Weiss, I. R., & Weston, E. A. (1992). *The 1990 science report card: NAEP's assessment of fourth, eighth, and twelfth graders.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

Mullis, I. V. S., Owen, E. H., & Phillips, G. W. (1990). *Accelerating academic achievement: A summary of findings from 20 years of NAEP.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[13] Fine, M. (1991). Framing dropouts. Albany, NY: State University of New York Press.

MacIver, D. J., & Epstein, J. L. (1990). How equal are opportunities for learning in disadvantaged and advantaged middle grade schools? (Report No. 7). Center for Research on Effective Schooling for Disadvantaged Students. Baltimore, MD: Johns Hopkins University.

Oakes, J. (1990). Opportunities, achievement, and choice: Women and minority students in science and mathematics. *Review of Educational Research, 16.*

Stevens, F. (1993). *Opportunity to learn: Issues of equity for poor and minority students.* Washington, DC: National Center for Education Statistics.

[14] King, S.H. (1993). The limited presence of African-American teachers. Review of Educational Research, 63, 115-149.

Meier, K. J., Stewart, J. Jr., & England, R. E. (1989). *Race, class, and education: The politics of second generation discrimination.* Madison, WI: The University of Wisconsin Press.

Pink, W. T. (1982). Academic failure, students' social conflict, and delinquent behavior. *The Urban Review, 14,* 141-180.

[15] Peng, S. (1995). *Understanding racial-ethnic differences in secondary science and mathematics achievement.* National Science Foundation. Washington, DC: National Center for Education Statistics.

These factors are consistent with other research that has used NAEP results to explore differences in performance between racial groups.[18] Recent arguments demonstrate that reporting unadjusted differences among racial groups may be misleading since these groups come from different family, school, and community contexts that are related to achievement. When achievement results are controlled for social context, test score differences between groups may be reduced.[19] Other research shows that while a substantial performance gap still exists, the performance difference between non-Hispanic White 13- and 17-year-olds and their Hispanic and Black peers has narrowed between 1975 and 1990. Gains among Black and Hispanic students, however, could not be explained by changing family characteristics (parental education level, family size, family income) alone.[20]

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[16] Jones, L. R., Mullis, I. V. S., Raizen, S. A., Weiss, I. R., & Weston, E. A. (1992). *The 1990 science report card: NAEP's assessment of fourth, eighth, and twelfth graders.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[17] Kahle, J. B., & Lakes, M. K. (1983). The myth of equality in science classrooms. *Journal of Research in Science Teaching, 20,* 131-140.

Linn, M. C., & Hyde, J. S. (1989). Gender, mathematics, and science. *Educational Researcher, 18(8),* 17-27.

Oakes, J. (1990). Opportunities, achievement, and choice: Women and minority students in science and mathematics. *Review of Research in Education, 16.*

[18] Berends, M., & Koretz, D. M. (1995). Reporting minority students' test scores: How well can the National Assessment of Educational Progress account for differences in social context? *Educational Assessment, 3(3),* 249-285.

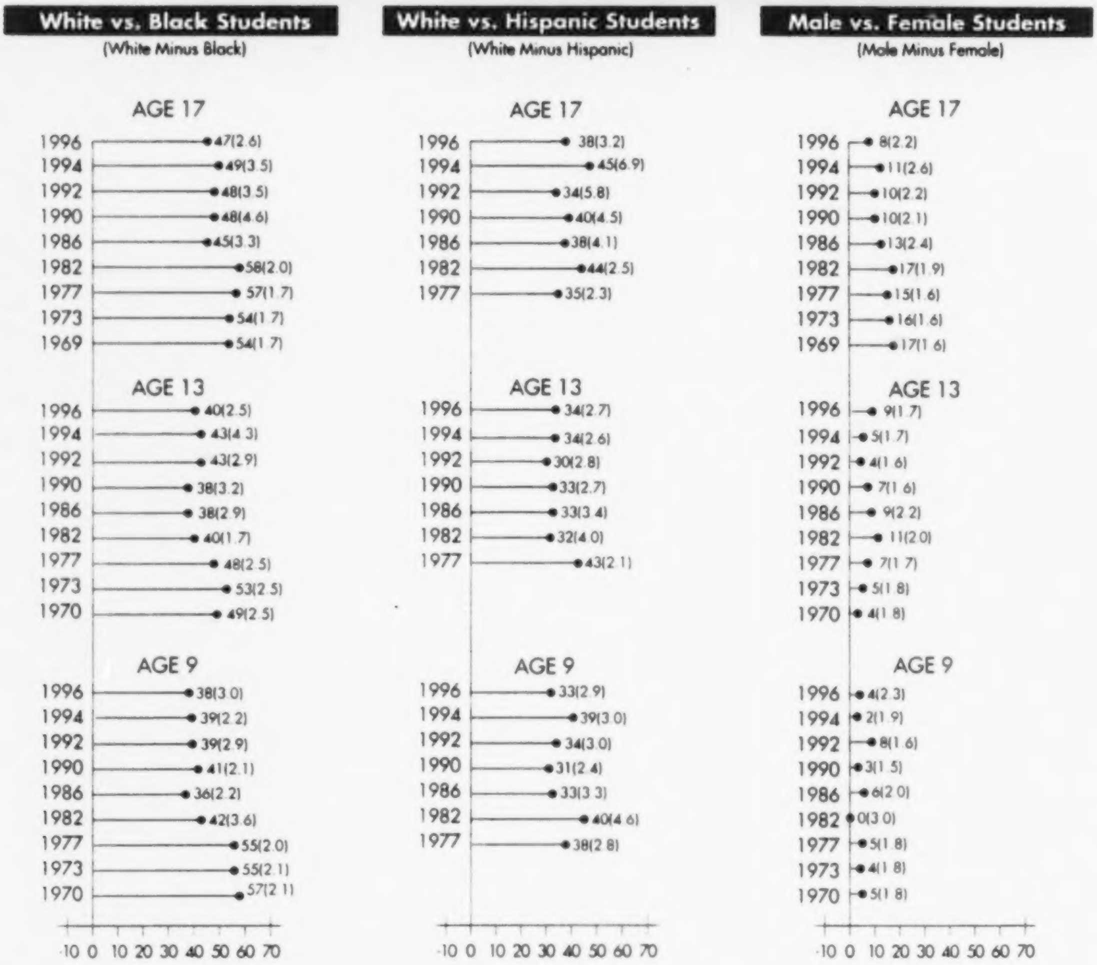
Jaynes, G. D., & Williams, R. M. Jr. (Eds.). (1989). *A common destiny: Blacks and American society.* National Academy Press: Washington, DC.

Grissmer, D.W., Kirby, S. N., Berends, M., & Williamson, S. (1994). *Student achievement and the changing American family.* Santa Monica, CA: Rand.

[19] Berends, M., & Koretz, D. M. (1995). op. cit.

[20] Grissmer, D.W., Kirby, S. N., Berends, M., & Williamson, S. op. cit.

Figure 1.6 Trends in Differences in Average Science Scale Scores by Race/Ethnicity and Gender



White vs. Black Students

	*	‡	L	Q
Age 17			-	
Age 13	-		-	+
Age 9	-		-	+

White vs. Hispanic Students

	*	‡	L	Q
Age 17				
Age 13				+
Age 9				

Male vs. Female Students

	*	‡	L	Q
Age 17	-		-	
Age 13				-
Age 9				

Standard errors of the estimated scale score differences appear in parentheses.

* Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (-) than that in 1969-70 (for White vs. Black student and Male vs. Female student differences) or from 1977 (for White vs. Hispanic student differences).

‡ Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (-) than that in 1994.

L Indicates that the positive (+) or negative (-) linear trend is significant.

Q Indicates that the positive (+) or negative (-) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

White-Black. In 1996, at all three age groups, White students outperformed Black students. Trend analyses revealed a narrowing gap between White and Black students' average science scores across the assessment years for each age group. For 17-year-olds, this narrowing was largely due to an 18-point gain by Black students between 1982 and 1986, compared to a 5-point gain by White students during the same time period. However, the 1969 and 1996 scale score gaps were not significantly different. The score gap between White and Black 13-year-old students declined between 1970 and 1986, and changed little during the 1990s. As a result, the 1996 score difference was smaller than the 1970 difference. Again, this decline was due to an increase in Black students' scores from 1973 to 1986, while White students' scores remained relatively stable. Among 9-year-olds, the trend in score differences is similar. The gap in scores between White and Black students declined between 1970 and 1986, and changed little since that time. The size of the gap was smaller in 1996 than in 1970. The reason for the gap reduction for 9-year-olds was improved performance among Black students between 1977 and 1986, while White students' performance changed little during this time.

White-Hispanic. In 1996, at all three ages, White students outperformed Hispanic students. For both 9- and 17-year-old students, trend analyses across the assessment years 1977 to 1996 revealed no overall change in the average score gaps between White and Hispanic students. Direct comparisons of the 1977 and 1996 score gaps showed no statistically significant difference for either age group. Among 13-year-olds, there was some evidence that the difference in average scale scores between White and Hispanic students decreased between 1977 and 1982, but the gap has changed little since that time. There was no significant difference between the 1977 and 1996 score gaps.

Male-Female. In 1996, male 13- and 17-year-olds had higher average science scores than did their female peers. The difference in average scores between 17-year-old male and female students declined over the assessment years due primarily to a decrease that occurred after 1982. This reduction in the gap resulted from a 14-point gain for female students between 1982 and 1992, while scores for males increased by 7 points during that same time period. The difference between males and females in 1996 was smaller than the difference in 1969. Among 13-year-olds, trend analyses across the assessment years 1970 to 1996 showed evidence of a widening gap between males and females from 1970 to 1982. The gap then narrowed somewhat until 1992, but appears to have widened again in the last two assessments. The score gap in 1996 did not differ significantly from that in 1970. Despite some fluctuation among 9-year-olds across the assessments, there was no significant change in the magnitude of the differences between male and female students' average scores.

Trends in Science Scale Scores by Region from 1969-70 to 1996

Given the diversity among school districts across the United States, it is interesting to explore trends within separate regions of the country. These data reveal the changes that have occurred in the last 27 years for students in different areas of the country — Northeast, Southeast, Central, and West — and demonstrate whether overall performance gains or losses in science were similar for different geographic regions. Figure 1.7 depicts trends in average science scale scores by region.

Northeast. For 17-year-olds in the Northeast, science scores decreased between 1969 and 1982, but have since increased. Despite these gains, the average score in 1996 was still below the average in 1969. For 13-year-olds, there were no significant changes between 1970 and 1996. Nine-year-olds showed early declines followed by subsequent gains in science performance. Although the overall trend is positive, the 1996 average score did not differ significantly from the 1970 average score.

Southeast. The average score of 17-year-olds in the Southeast decreased in the 1970s. Despite subsequent gains, the average score in 1996 did not differ significantly from the average in 1969. For 9- and 13-year-old students, an overall pattern of increased performance was observed. For both age groups, average scores in 1996 were higher than those in 1970.

Central. Among 17-year-olds in the Central region, the average science score declined from 1969 to 1982, but has since increased. The 1996 average score was not significantly different from that in 1969; further, although the observed 1996 average was about 10 points higher than the observed 1994 average, this difference was not statistically significant. For 13-year-olds, science scores decreased from 1970 to 1986, then increased. For 9-year-olds, science scores declined in the 1970s, then increased. For both 9- and 13-year-olds, the trend analyses revealed an overall pattern of improvements; however, the average scores for both age groups in 1996 were not significantly different from those in 1970.

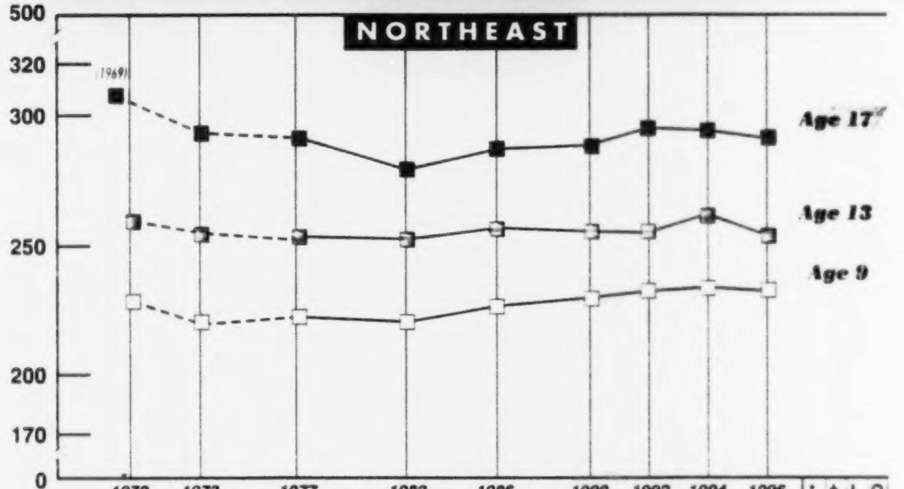
West. Decreasing scores were observed for 17-year-olds in the West from 1969 to 1982, followed by increasing scores in the 1980s. However, the overall trend was one of decreasing performance and the 1996 average score for these students continued to be lower than the average score of their counterparts in 1969. The overall pattern of performance for 9- and 13-year-olds was one of improved performance. Despite small gains across the assessment years, the 1970 and 1996 average scores did not differ significantly for either age group.

A comparison of the 1996 average scores of students from different regions revealed that, for both 13- and 17-year-olds, students in the Central region outperformed their peers in the Southeast and West. Thirteen-year-olds in the Central region also had higher average scores than students in the Northeast. No regional differences were observed for 9-year-olds.

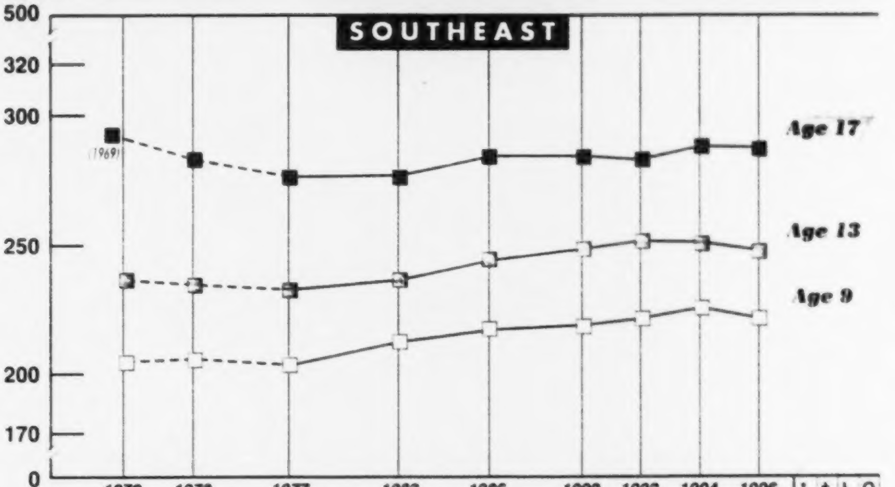
Figure 1.7

Trends in Average Science Scale Scores by Region, 1969-70 to 1996

THE NATION'S REPORT CARD naep



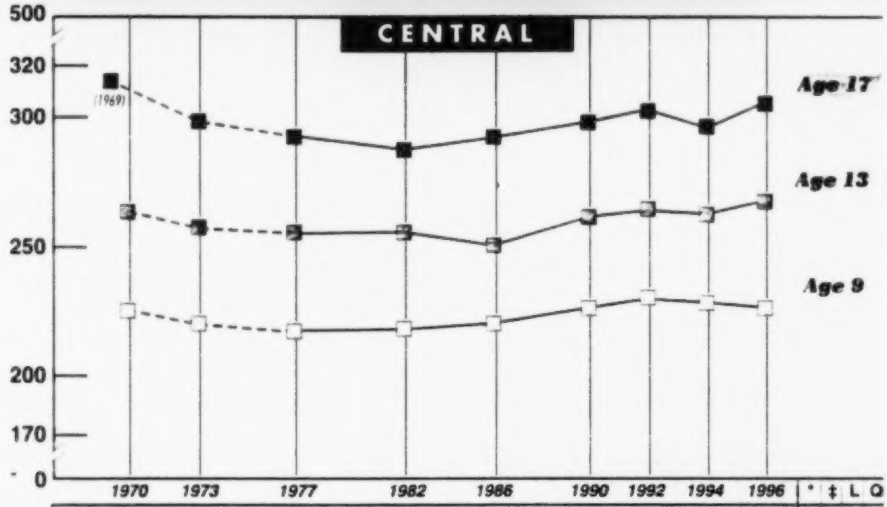
	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	308(2.5) -	298(2.5) -	296(2.2) 24(1.7)	284((2.0) 25(3.0)	292(4.3) 24(0.8)	293(3.2) 22(1.0)	300(2.4) 22(0.9)	299(4.2) 23(1.0)	297(3.3) 23(2.7)	–			+
Age 13	261(2.2) –	256(2.2) -	255(2.3) 26(1.5)	254(2.1) 24(2.9)	258(3.1) 22(1.6)	257(2.7) 24(1.0)	257(2.2) 21(0.8)	263(1.7) 20(0.9)	256(2.9) 22(2.0)				
Age 9	230(2.9) -	222(2.9) —	224(1.6) 25(1.5)	222(2.9) 19(2.3)	228(3.5) 21(1.1)	231(2.4) 23(0.9)	234(2.8) 21(1.2)	235(2.5) 22(0.9)	235(2.5) 22(2.3)			+	+



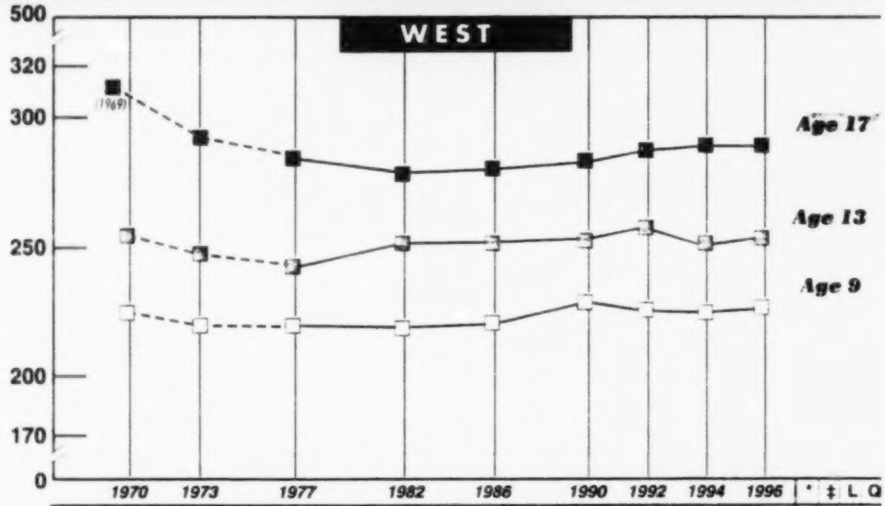
	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	287(2.3) -	283(2.3) —	276(1.9) 18(1.0)	276(2.7) 21(2.4)	284(2.0) 23(2.3)	284(2.4) 24(0.9)	283(2.5) 25(1.4)	288(2.8) 25(1.5)	287(3.1) 22(2.9)				+
Age 13	239(2.4) -	237(2.4) —	235(1.8) 21(1.1)	239(2.3) 22(2.3)	247(2.2) 25(5.8)	251(1.9) 23(0.8)	254(2.8) 24(1.6)	253(2.6) 22(1.7)	250(2.7) 25(2.6)	+		+	
Age 9	206(1.6) -	207(1.6) —	205(2.9) 20(1.2)	214(3.6) 23(2.7)	219(3.1) 23(4.7)	220(1.9) 24(0.9)	223(1.7) 24(1.3)	227(2.2) 25(1.5)	223(3.4) 23(2.6)	+		+	

Figure 1.7 (continued)

Trends in Average Science Scale Scores by Region, 1969-70 to 1996



	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	308(1.9) –	300(1.9) –	294(1.5) 33(1.6)	289(2.6) 30(3.9)	294(2.3) 28(2.2)	300(3.0) 26(0.9)	304(2.7) 25(1.0)	298(3.7) 26(1.1)	307(2.5) 25(0.9)				+
Age 13	262(1.8) –	256(1.8) –	254(1.8) 27(1.9)	254(2.6) 28(3.9)	249(5.3) 25(5.0)	260(2.8) 24(0.7)	263(2.1) 27(1.0)	261(3.5) 27(1.8)	266(1.8) 23(1.0)			+	+
Age 9	233(3.0) –	228(3.0) –	225(2.2) 30(1.9)	226(3.5) 30(4.3)	228(2.2) 29(4.0)	234(1.7) 24(0.6)	238(1.8) 28(0.8)	236(2.7) 26(1.0)	234(2.1) 25(0.9)			+	+



	1970	1973	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	308(1.7) –	295(1.7) –	287(1.5) 24(1.9)	281(2.7) 25(2.6)	283(3.8) 26(0.9)	286(2.3) 28(0.9)	290(3.8) 29(0.9)	292(4.1) 27(1.0)	292(2.2) 30(2.3)	–		–	+
Age 13	255(1.8) –	248(1.8) –	243(2.3) 26(2.1)	252(2.8) 26(2.5)	252(2.7) 28(1.5)	253(2.1) 29(0.9)	258(1.6) 29(0.9)	252(2.1) 31(1.1)	254(1.9) 30(1.9)			+	
Age 9	226(2.2) –	221(2.2) –	221(2.2) 25(2.0)	220(4.1) 28(2.7)	222(3.2) 28(1.6)	230(1.8) 28(0.8)	227(2.2) 27(0.8)	226(2.7) 28(1.0)	228(2.1) 30(2.6)			+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

[– – –] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1969-70.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Science Scale Scores by Parents' Highest Level of Education from 1977 to 1996

A consistent predictor of students' achievement is the education level of their parents.[21] In general, students with less-educated parents tend to have lower academic scores than students whose parents have higher levels of educational attainment. Similarly, adults whose parents completed more years of education typically have more advanced literacy skills than those whose parents have fewer years of education.[22]

Figure 1.8 presents trends in average science scores by parents' highest level of education. When one compares the 1996 average science scores for groups of students with different levels of parental education, the results generally reveal higher average science scores for students with higher levels of parental education. This pattern was consistent for all age groups with only two exceptions among 9-year-olds: no significant performance differences were found between students with parents whose highest education level was high school graduation and those whose parents did not graduate from high school, or between students with parents who had graduated from college and those whose parents' highest education level was some education beyond high school.

The percentage of students in each age group who reported that one or both parents had graduated from college increased from 1977 to 1996. Conversely, the percentage of students who reported their parent(s) had less than a high school diploma decreased during this time period for all three age groups. It should be noted that across the trend assessments, approximately one-third of 9-year-olds and one-tenth of 13-year-olds responded "I don't know" to the question about their parents' highest level of education. Furthermore, some research has revealed the potential for young children to provide inaccurate reports about such information.[23]

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[21] National Center for Education Statistics (1990). *A profile of the American eighth grader: NELS:88 student descriptive summary* (NCES 90-458). Washington, DC: U.S. Government Printing Office.

Jones, L. R., Mullis, I. V. S., Raizen, S. A., Weiss, I. R., & Weston, E. A. (1992). *The 1990 science report card: NAEP's assessment of fourth, eighth, and twelfth graders.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[22] Kirsch, I. S., Jungeblut, A., Jenkins, L., & Kolstad, A. (1993). *Adult literacy in America: A first look at the results of the National Adult Literacy Survey.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

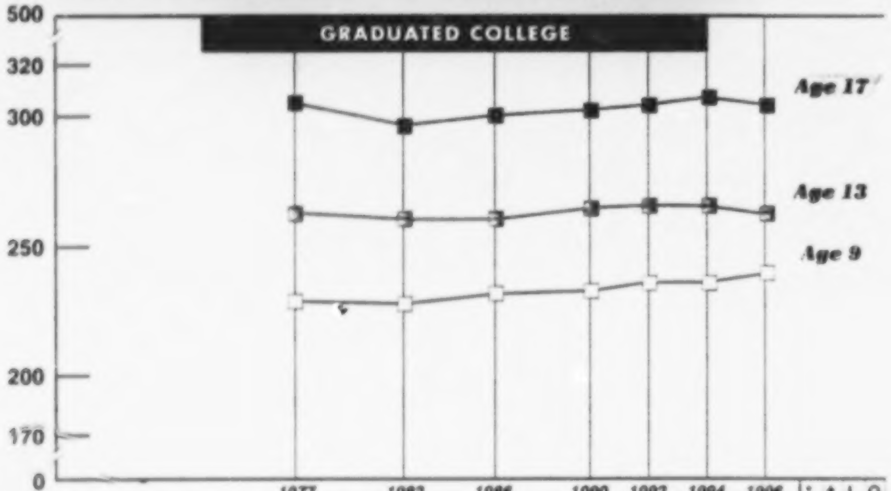
[23] Looker, E. D. (1989). Accuracy of proxy reports of parental status characteristics. *Sociology of Education, 62*(4), 257-276.

For 17-year-olds with at least one college-educated parent, a decline in science scores between 1977 and 1982 was followed by a period of increases. The average score of 17-year-old students who reported high school graduation as their parents' highest level of education also declined between 1977 and 1982 and has increased since that time. However, the average score for both groups of students in 1996 was not significantly different from the average score in 1977. No overall trends in average scores were observed for 17-year-olds whose parents had not graduated from high school or had some education after high school.

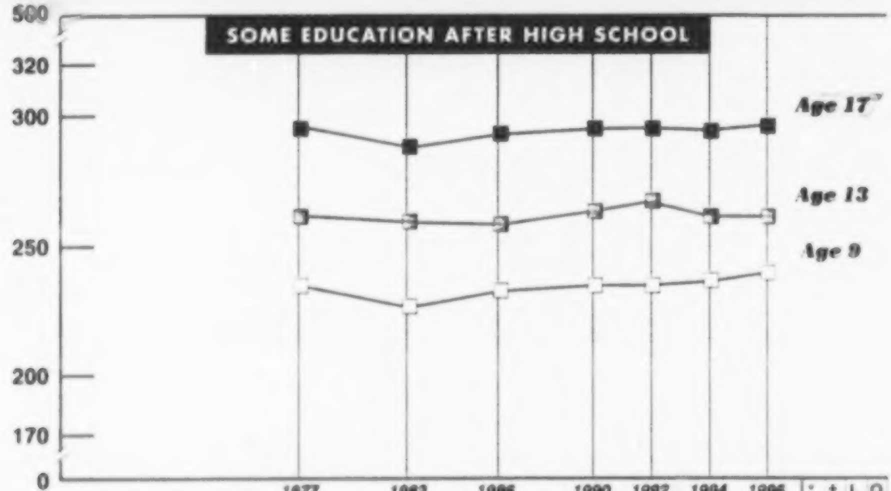
Among 13-year-olds whose parents had not graduated from high school, an overall pattern of increasing scores was observed across the assessment years. However, the average score in 1996 did not differ significantly from that in 1977. The performance of 13-year-olds at other levels of parental education showed no significant linear or quadratic trend over the assessment years.

The average science scores for 9-year-olds who reported that at least one parent graduated from college followed an increasing trend across the assessment years, resulting in a higher average score in 1996 compared to that in 1977. A similar trend was observed for 9-year-olds who reported that neither parent had graduated from high school. No overall trends in average scores were observed for 9-year-olds whose parents' highest level of education was either a high school diploma or some education after high school.

Figure 1.8 Trends in Average Science Scale Scores by Parents' Highest Level of Education, 1977 to 1996



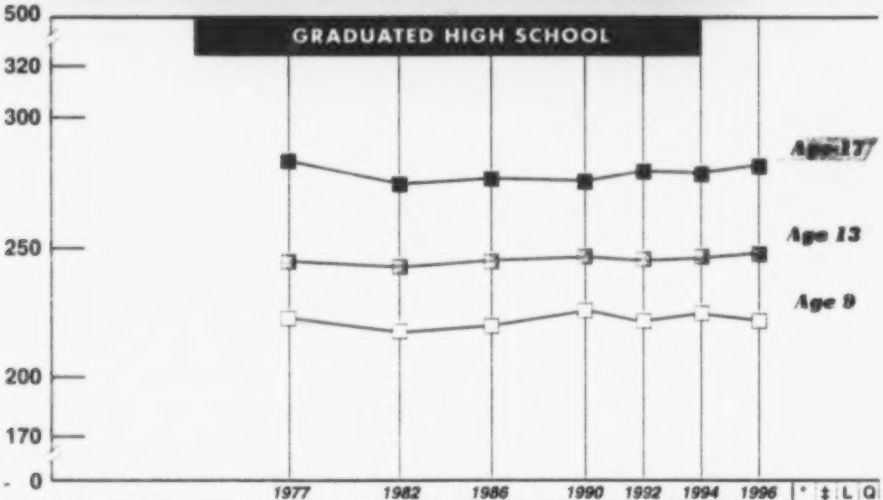
	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	309(1.0) 30(1.2)	300(1.7) 32(1.4)	304(2.1) 37(1.2)	306(1.7) 39(1.4)	308(1.3) 43(1.4)	311(1.6) 44(1.5)	308(1.5) 46(1.5)				+
Age 13	266(1.0) 27(1.0)	264(1.5) 37(1.5)	264(1.9) 38(2.0)	268(1.1) 41(1.2)	269(1.0) 44(1.3)	269(1.3) 46(1.3)	266(1.2) 45(1.6)				
Age 9	232(1.4) 23(0.7)	231(2.3) 42(2.3)	235(1.4) 38(1.1)	236(1.3) 40(1.1)	239(1.2) 42(1.2)	239(1.4) 45(0.8)	240(1.5) 43(1.2)	+		+	



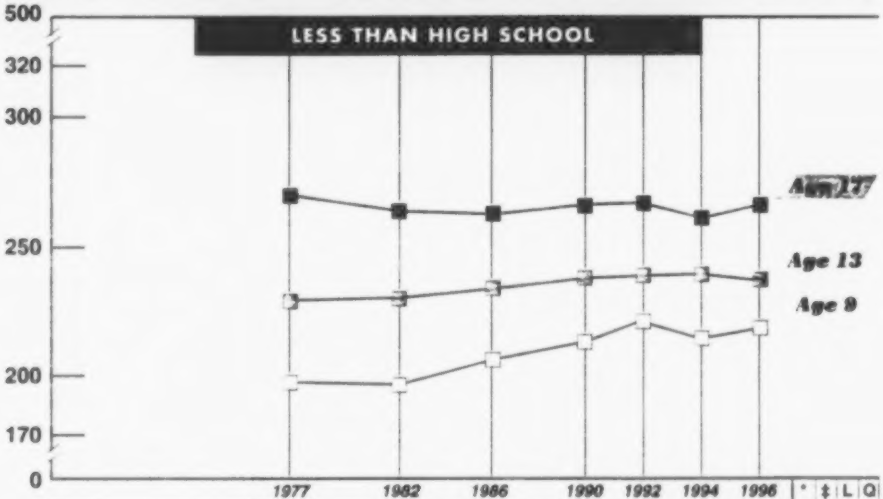
	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	296(1.1) 17(0.4)	290(1.7) 22(0.6)	295(2.5) 24(1.0)	297(1.6) 24(0.9)	296(1.7) 25(0.9)	295(1.9) 24(1.1)	297(1.9) 24(1.1)				
Age 13	260(1.3) 15(0.5)	259(1.5) 17(0.6)	258(1.4) 16(0.6)	263(1.2) 17(0.6)	266(1.1) 18(0.7)	260(2.0) 17(0.6)	260(1.3) 17(0.5)				
Age 9	237(1.5) 7(0.3)	229(3.2) 8(0.6)	236(2.6) 7(0.6)	238(2.1) 7(0.4)	237(2.4) 8(0.4)	239(2.8) 7(0.4)	242(3.9) 7(0.4)				

Figure 1.8 (continued)

Trends in Average Science Scale Scores by Parents' Highest Level of Education, 1977 to 1996



	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	284(0.8) 33(0.6)	275(1.6) 29(0.9)	277(2.0) 28(1.1)	276(1.4) 26(1.1)	280(2.4) 21(0.9)	279(1.7) 22(0.8)	282(2.7) 21(1.1)				+
Age 13	245(1.1) 33(0.6)	243(1.3) 26(1.1)	245(1.4) 31(1.3)	247(1.3) 27(0.8)	246(1.4) 23(0.9)	247(1.2) 23(0.9)	248(1.6) 23(1.0)				
Age 9	223(1.4) 27(0.5)	218(3.3) 15(1.1)	220(1.5) 16(0.7)	226(1.7) 16(0.7)	222(1.9) 14(0.7)	225(1.4) 14(0.6)	222(2.5) 13(0.6)				



	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	265(1.3) 15(0.9)	259(2.4) 13(0.7)	258(3.1) 8(0.4)	261(2.8) 8(0.6)	262(3.8) 8(0.6)	256(4.2) 7(0.5)	261(3.9) 6(0.7)				
Age 13	224(1.3) 13(0.7)	225(1.9) 10(0.6)	229(2.7) 8(1.1)	233(2.1) 8(0.5)	234(2.9) 6(0.5)	234(2.5) 6(0.4)	232(3.2) 6(0.4)			+	
Age 9	199(2.2) 9(0.4)	198(6.0) 7(0.9)	204(2.9) 4(0.4)	210(2.7) 5(0.4)	217(2.6) 4(0.3)	211(3.4) 4(0.4)	215(4.0) 4(0.5)	+		+	

Figure 1.8
(continued)

Trends in Average Science Scale Scores by Parents' Highest Level of Education, 1977 to 1996

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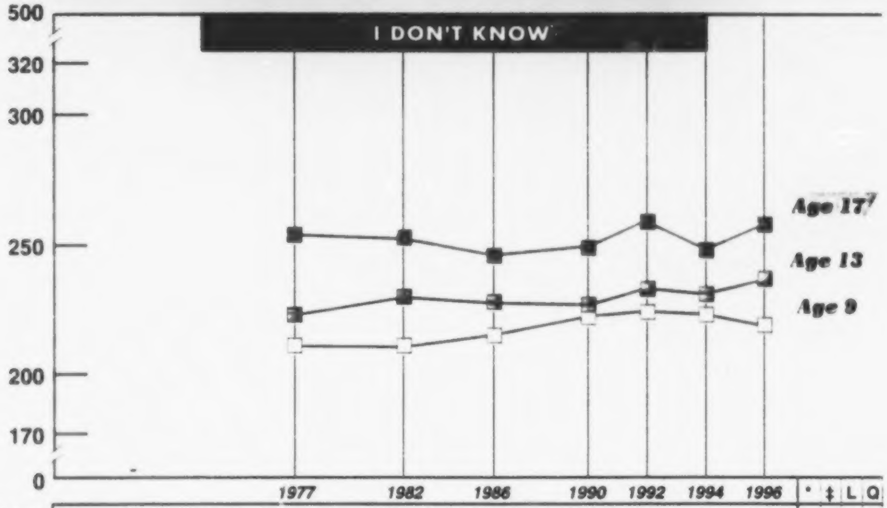

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17[7]	253(3.2) 4(0.4)	252(3.9) 5(0.8)	245(5.5) 3(0.3)	248(5.5) 3(0.4)	258(7.4) 3(0.3)	247(6.7) 3(0.3)	257(7.2) 2(0.2)				
Age 13	222(1.8) 13(1.1)	229(2.8) 11(1.2)	227(2.7) 8(0.4)	224(2.1) 8(0.5)	232(2.0) 8(0.4)	230(2.5) 8(0.5)	236(2.2) 10(0.6)	+		+	
Age 9	211(1.4) 34(0.7)	211(2.8) 29(1.8)	215(1.5) 35(1.0)	222(1.2) 32(0.8)	224(1.4) 33(0.8)	223(1.9) 30(0.8)	219(1.1) 33(0.9)	+		+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Trends in Science Scale Scores by Type of School from 1977 to 1996

In recent years, there has been considerable interest in comparing the performance of students attending public and nonpublic schools. The public versus private school debate was fueled about 15 years ago by a major report which concluded that students in private schools had higher achievement than public school students.[24] Sampling procedures used for the NAEP long-term trend assessments make it possible to report on the performance of 9-, 13-, and 17-year-old students attending public and nonpublic schools.[25] (Results by type of school are not available for extrapolated data.) Previous NAEP assessments have found that nonpublic school students had higher average science scores than their public school peers.[26]

Inferences about the relative effectiveness of public and nonpublic schools should not be solely based on NAEP results, however. Average performance differences between the two types of schools may be related to socioeconomic and sociological factors such as per-pupil expenditures, academic curricula, course-taking patterns, disciplinary climate, and the level of parental aspirations and involvement in students' education.[27] Some research has suggested that differences between the academic performance of students attending public and nonpublic schools are minimal when certain factors are controlled such as parental attitudes, student body stability, level of course work, and general school climate.[28]

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[24] Coleman, J. S., Hoffer, T., & Kilgore, S. (1982). *High school achievement: Public, Catholic, and private schools compared.* Basic Books.

[25] Nonpublic schools include Catholic and other private schools.

[26] Campbell, J. R., Reese, C. M., O'Sullivan, C., & Dossey, J. A. (1996). *NAEP 1994 trends in academic progress.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

[27] Alexander, K. L., & Pallas, A. M. (1983). Private schools and public policy: New evidence on cognitive achievement in public and private schools. *Sociology of Education, 56,* 170-182.

Berliner, D., & Biddle, B. (1996). In defense of schools. *Vocational Education Journal, 71*(3), 36-38.

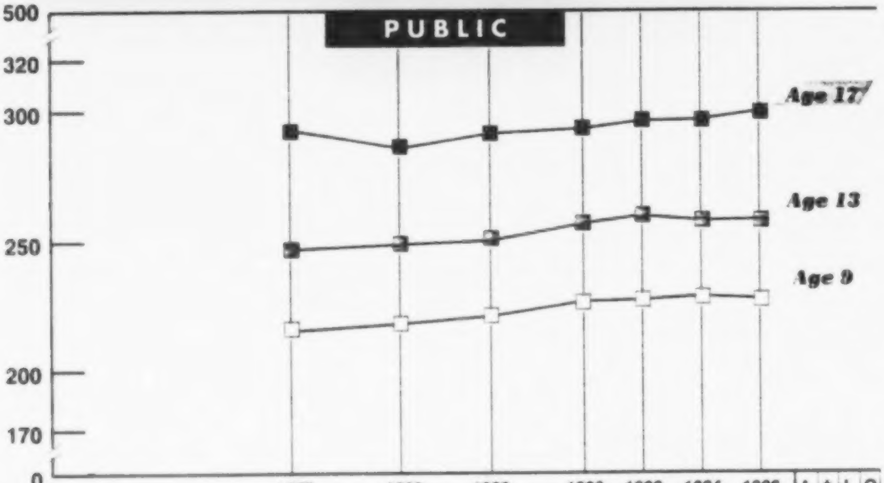
[28] Mullis, I. V. S., Jenkins, F., & Johnson, E. G. (1994). *Effective schools in mathematics: Perspectives from the NAEP 1992 assessment.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

Figure 1.9 contains trend data on the percentages of students attending public and nonpublic schools and their corresponding science scores. The percentages of students attending public and nonpublic schools showed no specific trend over the assessment years. Among 9- and 13-year-olds in 1996, the average science scores of nonpublic school students were higher than those of their public school peers. In contrast, the apparent difference observed between public and nonpublic students at age 17 was not significant.

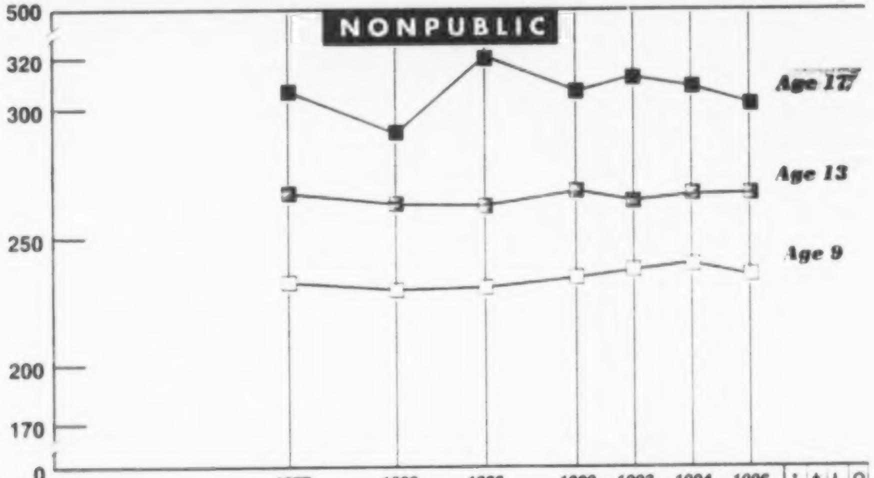
Public School Students. For 17-year-old students in public schools, a decline in average scores was observed between 1977 and 1982. Gains have been made since that time, however, and the overall pattern was one of improved performance. The average scores of 9- and 13-year-old public school students showed a pattern of general increase between 1977 and 1996. For all three age groups, the average score in 1996 was higher than in 1977.

Nonpublic School Students. Despite some fluctuations, no consistent pattern of change was evident across the assessments in the science performance of 13- and 17-year-olds attending nonpublic schools. The average scores of 13- and 17-year-olds in 1996 were not significantly different from the average scores in the 1977 assessment. Nine-year-olds showed a general trend of increasing scores over the assessment years, but there was no significant difference between average scores in 1977 and 1996.

Figure 1.9 Trends in Average Science Scale Scores by Type of School, 1977 to 1996



	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	288(1.0) 94(1.8)	282(1.1) 90(2.0)	287(1.6) 96(1.4)	289(1.1) 93(1.8)	292(1.3) 90(2.4)	292(1.5) 88(2.3)	295(1.2) 91(1.7)	+		+	+
Age 13	245(1.2) 90(1.4)	249(1.4) 89(1.7)	251(1.4) 96(1.8)	254(1.1) 90(1.4)	257(1.0) 88(1.9)	255(1.1) 88(1.7)	255(1.1) 89(1.8)	+		+	
Age 9	218(1.4) 89(1.2)	220(2.0) 90(2.3)	223(1.4) 84(2.7)	228(0.9) 89(2.1)	229(1.0) 87(1.6)	230(1.4) 88(1.8)	229(1.3) 87(1.5)	+		+	



	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	308(2.4) 6(1.8)	292(2.9) 10(2.0)	321(10.1) 4(1.4)	308(6.6) 7(1.8)	312(3.7) 9(2.1)	310(4.8) 12(2.3)	303(5.5) 9(1.7)				
Age 13	268(2.1) 10(1.4)	264(3.2) 11(1.7)	263(6.4) 4(1.8)	269(1.8) 10(1.4)	265(2.4) 12(1.9)	268(2.6) 12(1.7)	268(5.0) 11(1.8)				
Age 9	235(2.2) 11(1.2)	232(3.2) 10(2.3)	233(2.9) 16(2.7)	237(2.4) 11(2.1)	240(2.7) 13(1.6)	242(2.8) 12(1.8)	238(3.8) 13(1.5)			+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Summary

- The science performance of students in all three age groups declined during the first few assessments, but has since improved. For 9- and 13-year-olds, the overall pattern was one of increasing performance, but for 17-year-olds, the overall pattern was one of decreasing performance. For all three groups, average scores in 1996 were not significantly different from those in 1994. Comparing the average scores in 1996 to those in 1969-70, the 1996 average score was higher for 9-year-olds, did not differ significantly for 13-year-olds, and was lower for 17-year-olds.
- The percentages of 9-year-olds at or above Levels 150, 200, 250, and 300 were higher in 1996 than in 1977. Increases also occurred between 1977 and 1996 in the percentages of 13-year-olds reaching Levels 150, 200, and 250, and in the percentages of 17-year-olds reaching Levels 300 and 350.
- The average science scores of 9- and 13-year-olds in the upper, middle two, and lower quartiles of the performance distribution increased between 1977 and 1996. This pattern was also observed among 17-year-olds in the upper and middle two quartiles, but not among those in the lower quartile.
- Earlier declines and more recent gains characterize the science performance of 9-, 13-, and 17-year-old White students across the assessment years. The overall pattern for 9- and 13-year-olds was one of increased performance. However, the 1996 average scores for 9- and 13-year-olds were not significantly improved over those in 1970, and the 1996 average for 17-year-old students was below that of their counterparts in 1969. In 1996, the average science scores of 9- and 13-year-old Black students were improved over those in 1970. Despite an overall pattern of increased performance for Black 17-year-olds, their average scores in 1969 and 1996 were not significantly different. For 9-, 13-, and 17-year-old Hispanic students, an overall pattern of improved performance was shown. Average scores in 1996 were higher than those in 1977 for 9- and 13-year-olds, but not for 17-year-olds.
- The average science scores of both male and female students at all ages declined during the early assessments, then increased. For male and female students aged 9 and 13, trend analyses revealed an overall pattern of improved performance. Despite the improvements, the 1996 average scores for 9- and 13-year-old males were not significantly higher than those in 1970. For 9-year-old females, the average score was higher in 1996 than in 1970. There was no significant difference between the 1970 and 1996 average scores for age 13 females. For 17-year-old males and females alike, the average score in 1996 was below that in 1969.
- In 1996, White students in all three age groups continued to outperform their Black and Hispanic peers in science. For all three age groups, the overall trend across the assessments was one of narrowing gaps between White and Black students' average scores. For 9- and 13-year-olds, the gap between Black and White students' average science scores was smaller in 1996 than in 1970. The magnitude of the gap in 1996 for 17-year-olds was not significantly different from that in the first assessment. For all three age groups, the difference between White and Hispanic students did not change significantly between 1977 and 1996.

- The average score difference between 9-year-old males and females changed little across the assessments. Despite some fluctuation over time among 13-year-olds, the average score difference in 1996 did not differ from that in 1970. The gaps between the average scores of 17-year-old males and females declined over the years and, as a result, the difference in 1996 was smaller than the difference in 1969.

- In the Northeast and Central regions, average scores for 9-year-olds displayed a pattern of early declines followed by gains. In 1996, the average scores for 9- and 13-year-olds in these regions were not significantly different from those in 1970. Among 17-year-olds, the average score in 1996 for students in the Northeast was below that in 1969. Overall patterns of improvement were observed for 9- and 13-year-old students in the Southeast. Average scores for these groups in 1996 were higher than in 1970. For 17-year-olds in the Southeast, declining scores in the 1970s were followed by score increases, however, the average in 1996 did not differ significantly from that in 1970. In the West, the performance of 9- and 13-year-olds tended to improve across the assessment years, although average scores in 1996 did not differ from those in 1970. In 1996, the average score for 17-year-olds in the West was below the average in the first assessment.

- For each age group, increases from 1977 to 1996 were observed in the percentage of students who reported that one or both parents had graduated from college. The percentage of students who reported that their parent(s) had less than a high school education decreased during this time period for all three groups. An increase in average science scores between 1977 and 1996 was observed for 9-year-olds who reported that at least one parent had graduated from college and for 9-year-olds who reported that neither parent had graduated from high school. An overall pattern of improvement was found for 13-year-olds whose parent(s) did not have a high school diploma. For 17-year-olds with at least one parent who graduated from college and for 17-year-olds whose parents' highest level of education was high school graduation, a pattern of early declines in performance was followed by increases. In general, higher science scores were found for students with higher levels of parental education.

- In 1996, the average science scores of 9- and 13-year-old public school students were significantly below those of their nonpublic school peers. No significant difference was observed between public and nonpublic school 17-year-olds. The average scores of 9-, 13- and 17-year-old public school students showed a pattern of general increase, resulting in an average score in 1996 that was higher than that in 1977. Nine-year-old students attending nonpublic schools showed some improvement over the assessments, but did not have a significantly higher average score in 1996 than in 1977. Little change was observed across the assessments for 13- and 17-year-old nonpublic school students; for each group, the average score in 1996 was not significantly different from that in 1977.

Chapter 2

Students' Experiences in Science

Students need many experiences to become scientifically literate individuals who are ready to meet the challenges of the 21st century. Examples of such experiences include taking various types of science courses in school, being exposed to different modes of teaching and learning, and perceiving the role of science in one's life and in world affairs.[29] This chapter looks at the relationship between self-reported student experiences in science class and average science scale scores. Results from the 1996 trend assessment are compared with results from the first assessment in which information on that experience was collected.

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[29] Commission on Precollege Education in Mathematics, Science, and Technology (1983). *Educating Americans for the 21st century: A report to the American people and the National Science Board.* Washington, DC: National Science Board.

The National Science Foundation (1995/1996). *Statewide systemic initiatives in science, mathematics, and engineering.* Arlington, VA.

Project 2061 (1993). *Benchmarks for science literacy.* Washington, DC: American Association for the Advancement of Science.

Clinton, W. J., & Gore, A. (1994). *Science in the national interest.* Executive Office of the President. Washington, DC: Office of Science and Technology Policy.

National Research Council (1995). *National science education standards.* Washington, DC.

Participation in Scientific Experiments and Use of Equipment at Age 9

The central role of investigation in science teaching and learning has received much attention in recent years.[30] Hands-on experiences and the use of common science instruments are necessary parts of scientific investigation. Nine-year-olds were asked whether they had ever worked on or experimented with real-life scientific objects such as living animals and plants. Students were also asked whether they had ever used specific scientific instruments such as a microscope or thermometer. Table 2.1 compares 1977 and 1996 age 9 students' reported participation in five types of science experiments. Data on students' use of specific instruments are presented in Table 2.2. Average science scale scores are also displayed in the tables.

In 1996, 67 percent of 9-year-old students reported that they had experimented with living plants, which was not significantly different from the 70 percent reported in 1977. In 1996, 43 percent of students indicated that they had experience with living animal experiments. This percentage was decreased from 1977 when 55 percent reported experience with this type of experiment. There was no significant difference between 1977 and 1996 in students' reports of having experimented with batteries and bulbs. About 38 percent of

Table 2.1 **Participation in Scientific Experiments at Age 9, 1977 and 1996**

9-Year-Olds' Reporting on Having Experimented with...	Year	Students Answering "YES" Percent of Students	Students Answering "YES" Average Scale Score	Students Answering "NO" Percent of Students	Students Answering "NO" Average Scale Score
Living plants	1996	67 (1.5)	234 (2.4) *	28 (1.5)	224 (2.6)
	1977	70 (1.4)	221 (2.3)	27 (1.3)	217 (2.8)
Living animals	1996	43 (1.4) *	227 (3.0) *	53 (1.5) *	233 (2.1)
	1977	55 (1.5)	216 (2.8)	42 (1.3)	227 (2.1)
Batteries and bulbs	1996	52 (2.2)	235 (3.0)	41 (2.1)	227 (2.7) *
	1977	51 (1.4)	225 (2.8)	43 (1.4)	217 (2.1)
Shadows	1996	38 (1.7)	234 (3.0) *	54 (1.9)	231 (2.4) *
	1977	42 (1.6)	222 (3.1)	55 (1.7)	220 (1.9)
Dissolving things in water	1996	64 (1.7)	235 (2.5) *	28 (1.4)	225 (2.6) *
	1977	69 (1.4)	223 (2.0)	26 (1.2)	215 (2.6)

Standard errors of the estimated percentages and scale scores appear in parentheses.

Percentages may not total 100 because a small percentage of students responded "not certain" to each item.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1977.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[30] National Research Council (1995). National science education standards. Washington, DC.

Project 2061 (1993). *Benchmarks for science literacy.* Washington, DC: American Association for the Advancement of Science.

9-year-old students in 1996 reported having experience with shadow experiments; this result did not differ significantly from the percentage reported in 1977. Likewise, the percentage of 9-year-olds who had participated in experiments involving dissolving things in water showed no significant change between 1977 and 1996.

In 1996, students who reported having worked with living plants and dissolving things in water had higher average science scores than students without these experiences. No significant score differences were found between 9-year-olds with and without experience experimenting with shadows, living animals, or batteries and bulbs.

Regarding the use of scientific equipment, most 9-year-olds in 1996 reported that they had used a thermometer (91 percent) and a calculator (97 percent), and 73 and 77 percent indicated they had used a directional compass and stopwatch, respectively. All of these percentages were higher than in 1977. There were no significant differences in the percentages of students in 1996 and 1977 who reported using scales and microscopes.

In 1996, 9-year-olds who answered in the affirmative to each question concerning use of scientific instruments had higher average science scores than those who answered in the negative. (A comparison could not be made between students' responses to the question about calculator use due to the insufficient sample size of students responding "No" in 1996.)

Table 2.2

Use of Scientific Equipment at Age 9, 1977 and 1996

9-Year-Olds' Reporting on Having Used a...	Year	Students Answering "YES"		Students Answering "NO"	
		Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Scale to weigh things	1996	89 (0.8)	235 (1.8) *	9 (0.6)	217 (3.9) *
	1977	89 (0.8)	220 (2.3)	9 (0.7)	202 (4.5)
Thermometer	1996	91 (0.8) *	234 (1.8) *	7 (0.7) *	208 (5.1)
	1977	84 (1.0)	222 (2.2)	14 (0.9)	199 (2.7)
Microscope	1996	58 (1.9)	238 (2.2) *	36 (1.7) *	224 (1.7) *
	1977	53 (1.4)	222 (2.5)	43 (1.5)	214 (2.1)
Calculator	1996	97 (0.5) *	233 (1.7) *	2 (0.3) *	*** (***)
	1977	87 (1.2)	222 (2.2)	11 (1.0)	195 (3.4)
Compass	1996	73 (1.1) *	235 (1.8) *	23 (1.1) *	225 (2.5) *
	1977	61 (1.3)	222 (2.3)	33 (1.2)	214 (2.7)
Stopwatch	1996	77 (1.1) *	236 (1.8) *	20 (0.9) *	219 (3.1)
	1977	44 (1.3)	223 (2.6)	49 (1.2)	215 (2.5)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1977.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Science Course Taking at Ages 9, 13, and 17

Since 1986, NAEP has gathered information about the percentages of students studying certain science subjects. Nine-year-olds were asked how frequently they have science class in school. Results for the nation are shown in Table 2.3. In 1996, the majority of students reported having science class "Every day" (30 percent) or "Several times a week" (31 percent). About one-fourth of 9-year-olds responded "About once a week" (18 percent) or "Less than once a week" (6 percent). About 15 percent responded that they "Hardly ever or never" had science class in school. No difference was observed between the percentages in 1986 and those in 1996. Among 9-year-olds who reported having science class every day, average scores increased between 1986 and 1996. In 1996, 9-year-olds who reported "Hardly ever or never" having science class had lower average science scores than their peers who reported having class about once a week or more frequently.

Table 2.3

Frequency of Science Classes at Age 9 for the Nation, 1986 and 1996

9-Year-Olds' Reports of Frequency of Science Class...	Year	Percent of Students	Average Scale Score
Hardly ever or never	1996	15 (0.9)	217 (1.6)
	1986	17 (1.3)	211 (2.5)
Less than once a week	1996	6 (0.4)	223 (4.5)
	1986	6 (0.5)	219 (3.4)
About once a week	1996	18 (0.8)	225 (2.2)
	1986	19 (1.1)	222 (2.1)
Several times a week	1996	31 (1.3)	237 (1.7)
	1986	31 (1.5)	232 (1.7)
Every day	1996	30 (1.6)	234 (1.9) *
	1986	28 (2.0)	227 (2.1)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1986.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Thirteen-year-old students in 1996 were asked what they were mainly studying in their current science class. Results for the nation are shown in Table 2.4. Of the 97 percent who were studying science, about equal percentages reported studying life science (21 percent), physical science (22 percent), and earth science (19 percent). In 1996, 28 percent reported studying a mixture of these three (general science), which was an increase over the percentage reported in 1986. The only significant change between 1986 and 1996 in average science scores was an increase among students primarily studying life science. In 1996, 13-year-olds who reported that the content of their science class was mainly life, physical, earth, or general science had higher average science scores than their peers who reported "Other" as the content or who reported that they were not taking a science class.

Table 2.4

Content of Science Classes at Age 13 for the Nation , 1986 and 1996

13-Year-Olds' Reports on the Content of Their Science Class...	Year	Percent of Students	Average Scale Score
Not taking science	1996	3 (0.8)	237 (4.9)
	1986	8 (1.8)	242 (4.5)
Life science	1996	21 (1.2)	253 (1.8) *
	1986	19 (2.4)	243 (2.3)
Physical science	1996	22 (1.9)	260 (1.7)
	1986	22 (2.9)	260 (2.8)
Earth science	1996	19 (1.8)	266 (2.1)
	1986	24 (3.5)	259 (2.3)
General science	1996	28 (1.7) *	259 (1.5)
	1986	20 (2.0)	255 (1.8)
Other	1996	7 (0.6)	242 (2.9)
	1986	6 (1.7)	245 (6.2)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1986.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Many school curricula follow the sequence of biology, chemistry, and physics. Therefore, most students have studied biology by the time they are 17 years old. Age 17 students were asked whether they were taking or had taken a course in general science, biology, chemistry, and physics. Tables 2.5 and 2.6 present the percentages of 17-year-old students taking these courses, and their average science scores. Results are given for the nation and by gender in Table 2.5, and for racial/ethnic groups in Table 2.6.

In 1996, nearly all 17-year-olds (94 percent) reported that they had taken or were currently taking biology, and 85 percent reported taking general science. Fifty-six percent reported taking chemistry, while relatively few students (14 percent) reported taking physics. For biology and chemistry, the national percentages were higher in 1996 than in 1986. For general science and physics, the 1986 and 1996 percentages were not significantly different. A direct comparison of average science scores in 1996 and 1986 showed that the average score in 1996 was higher than the previous decade for students who had taken general science and biology. Among 17-year-olds who had taken chemistry or physics, the 1996 average score was not significantly improved over the average in 1986.

Gender. Reflecting results for the nation, the percentages of male and female students taking biology and chemistry increased from 1986 to 1996. At the same time, the percentage of females taking physics increased, while no significant differences were observed for males or females in the percentages taking general science. In 1996, a higher percentage of 17-year-old females than males reported taking biology and chemistry, however, the percentage of males taking physics was higher than the percentage of females.

Comparisons of average scores in 1996 to those in 1986 showed improvement among females taking general science, biology, and physics. In contrast, no significant change was observed between 1986 and 1996 in the performance of males taking general science, biology, chemistry, or physics. Comparisons of average science scores between age 17 males and females in 1996 showed a number of significant differences between the two groups. Males taking general science, biology, and chemistry outperformed their female counterparts. No significant difference in performance was found between males and females taking physics, however.

Table 2.5 Science Course Taking at Age 17, for the Nation and by Gender, 1986 and 1996

17-Year-Olds' Reports on Taking Science Courses in...	Year	TOTAL Percent of Students	TOTAL Average Scale Score	MALE Percent of Students	MALE Average Scale Score	FEMALE Percent of Students	FEMALE Average Scale Score
General science	1996	85 (1.6)	297 (1.2) *	85 (1.6)	301 (1.8)	84 (1.8)	293 (1.4) *
	1986	83 (1.3)	290 (1.3)	84 (1.5)	298 (1.7)	82 (1.6)	283 (1.6)
Biology	1996	94 (0.8) *	300 (1.3) *	92 (1.2) *	305 (2.0)	95 (0.7) *	295 (1.6) *
	1986	88 (1.0)	294 (1.5)	87 (1.1)	301 (1.8)	88 (1.1)	287 (1.7)
Chemistry	1996	56 (1.6) *	315 (1.8)	53 (2.2) *	322 (2.7)	58 (1.7) *	310 (1.9)
	1986	40 (1.6)	312 (2.1)	42 (1.8)	319 (2.7)	39 (2.1)	304 (2.2)
Physics	1996	14 (1.1)	309 (3.5)	16 (1.3)	311 (4.1)	12 (1.0) *	306 (4.4) *
	1986	11 (0.9)	296 (4.7)	14 (1.3)	305 (6.8)	8 (0.7)	282 (3.8)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1986.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Race/Ethnicity. Table 2.6 presents trends in science course taking by race/ethnicity. Nearly all White (95 percent) and Black (94 percent) 17-year-old students in 1996 reported taking biology. The corresponding figure for Hispanic students was 87 percent. The percentage of White students who had taken biology was higher in 1996 than in 1986. Among all three racial/ethnic groups, the percentage of students taking chemistry increased considerably from 1986 to 1996, while no significant percentage changes were observed for any racial/ethnic group in physics.

For White 17-year-olds, average science scores among students taking general science and biology increased between 1986 and 1996. The performance of Black students taking physics also improved during this time period, but no significant differences were observed among Hispanic students taking any science subject. (It should be noted that the sample size of Hispanic students taking physics was insufficient to reliably estimate scale scores.)

In 1996, a higher percentage of White students than Black students reported taking general science. A greater percentage of Black students than White students, however, reported taking physics. About 58 percent of White 17-year-olds reported taking chemistry, which was higher than the 46 percent of Hispanic students. In 1996, White students had higher average science scores than their Black and Hispanic peers at each level of science course work. In interpreting these findings, it should be considered that science courses covering the same topic may vary in content and instructional approach from school to school and from state to state.

Table 2.6

Science Course Taking at Age 17, by Race/Ethnicity, 1986 and 1996

17-Year-Olds' Reports on Taking Science Courses in...		WHITE		BLACK		HISPANIC	
	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
General science	1996	86 (2.0)	306 (1.3) *	78 (1.9)	263 (2.5)	84 (2.8)	273 (2.6)
	1986	84 (1.6)	297 (1.5)	83 (2.6)	257 (2.8)	82 (3.5)	264 (4.5)
Biology	1996	95 (0.8) *	309 (1.3) *	94 (1.6)	265 (2.3)	87 (3.8)	276 (2.6)
	1986	89 (1.1)	301 (1.8)	84 (2.7)	260 (3.1)	84 (3.4)	265 (3.7)
Chemistry	1996	58 (1.9) *	323 (1.7)	49 (3.0) *	284 (3.9)	46 (3.6) *	292 (3.5)
	1986	43 (1.8)	317 (2.2)	29 (2.6)	275 (6.4)	24 (2.2)	281 (8.7)
Physics	1996	12 (1.3)	324 (4.6)	19 (1.6)	270 (4.8) *	16 (2.7)	*** (***)
	1986	10 (0.8)	316 (4.4)	18 (3.5)	239 (5.4)	13 (2.8)	*** (***)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1986.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Attitudes about the Value of Science at Ages 13 and 17

Students aged 13 and 17 were asked whether they agreed or disagreed with three statements about the value of science (Table 2.7). To determine whether attitudes have changed over time, the percentages of students in 1996 who agreed with these statements about the value of science were compared to the corresponding percentages in 1977. In general, relatively few changes in attitude were observed across the years. The only significant change was an increase in the percentage of 17-year-olds who agreed that science should be required in school. Among 13-year-olds, students in 1996 who agreed that science classes will be useful in the future had higher average science scores than students who agreed in the earlier assessment. Among 17-year-olds, higher scores were observed in 1996 than in 1977 among those who agreed with each statement about the value of science.

Table 2.7

Attitudes About the Value of Science at Ages 13 and 17, 1977 and 1996

			STRONGLY AGREE OR AGREE		UNDECIDED, DISAGREE, OR STRONGLY DISAGREE	
	Age	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Much of what you learn in science classes is useful in everyday life.	13	1996	56 (1.2)	256 (2.0)	44 (1.2)	255 (1.4)
		1977	58 (1.4)	249 (2.3)	43 (1.4)	256 (2.1)
	17	1996	55 (1.5)	299 (2.0) *	45 (1.5)	297 (2.4)
		1977	53 (1.2)	290 (2.4)	47 (1.2)	293 (1.8)
Much of what you learn in science classes will be useful in the future.	13	1996	71 (1.5)	258 (1.9) *	29 (1.5)	250 (1.7)
		1977	75 (1.2)	251 (2.1)	26 (1.2)	255 (2.8)
	17	1996	68 (1.2)	301 (1.7) *	32 (1.2)	293 (2.9)
		1977	65 (1.3)	292 (2.0)	35 (1.3)	290 (2.0)
Science should be required in school.	13	1996	71 (1.6)	258 (1.8)	29 (1.6)	250 (2.1)
		1977	70 (1.2)	252 (2.1)	30 (1.2)	252 (2.5)
	17	1996	76 (1.1) *	302 (1.7) *	24 (1.1) *	288 (2.5)
		1977	62 (1.1)	292 (2.0)	38 (1.1)	291 (2.4)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1977.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Thirteen- and 17-year-old students were also asked to respond to questions about the application of science in helping to remedy real-life problems. Table 2.8 shows the 1977 and 1996 percentages of students responding "Very much" to these questions.

Increases were observed in the percentages of 13-year-olds who agreed "Very much" that science applications could help prevent energy shortages, find cures for diseases, control weather, prevent birth defects, save natural resources, and reduce pollution. A decrease between 1977 and 1996 was observed for the statement about preventing starvation. In fact, the percentage of 13-year-olds in 1996 who felt that science could help prevent world starvation (16 percent) was just half that observed in 1977 (32 percent).

Among 17-year-olds, there were increases in the percentages of students who responded "Very much" to statements about the applications of science in preventing energy shortages, preventing birth defects, saving natural resources, and reducing pollution. A smaller percentage of students in 1996 than in 1977 agreed that science applications could help prevent world starvation and reduce overpopulation. As was observed at age 13, the percentage of 17-year-olds who expressed a belief that science could help prevent starvation dropped by about half (from 51 to 24 percent) between 1977 and 1996.

Table 2.8

Perceived Applications of Science at Ages 13 and 17, 1977 and 1996

How much do you think that the application of science can help...		PERCENTAGE OF STUDENTS RESPONDING "VERY MUCH"	
		AGE 13	AGE 17
Prevent world starvation?	1996	16 (0.9) *	24 (1.1) *
	1977	32 (1.5)	51 (1.2)
Save us from an energy shortage?	1996	68 (1.4) *	74 (1.2) *
	1977	54 (1.7)	70 (1.0)
Find cures for diseases?	1996	75 (1.2) *	87 (0.9)
	1977	70 (1.5)	85 (0.8)
Control weather?	1996	21 (1.0) *	18 (1.6)
	1977	15 (0.9)	16 (0.8)
Prevent birth defects?	1996	39 (1.4) *	53 (1.3) *
	1977	23 (1.2)	44 (1.2)
Save our natural resources?	1996	59 (1.7) *	59 (1.3) *
	1977	47 (1.1)	48 (1.2)
Reduce air and water pollution?	1996	56 (1.0) *	60 (1.2) *
	1977	44 (1.2)	54 (1.2)
Reduce overpopulation?	1996	13 (1.1)	14 (0.8) *
	1977	11 (0.8)	22 (0.8)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1977.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Summary

- No significant differences were observed between 1977 and 1996 in the percentage of 9-year-olds who reported having experimented with living plants, batteries and bulbs, shadows, and dissolving things in water. A smaller percentage of students in 1996 than in 1977 reported having experimented with living animals. In 1996, students who had experience working with living plants and dissolving things in water had higher average science scores than students without these experiences.
- A higher percentage of 9-year-old students in 1996 than in 1977 had used scientific equipment. The only exception was use of a microscope and a scale to weigh things, which did not change significantly between 1977 and 1996. For all types of equipment, students who had used each instrument had higher average science scores than students who had not.
- No significant differences between 1986 and 1996 were observed in the percentages of 9-year-olds' reports on frequency of science class. In 1996, the majority of students reported having science class at least several times a week. Only 15 percent of 9-year-olds reported never or hardly ever having science class. Among those who reported having science class every day, average science scores increased between 1986 and 1996.
- Among 13-year-olds, an increase between 1986 and 1996 was observed in the percentage of students taking general science. No significant differences were found in the percentages taking life science, physical science, or earth science. Higher average science scores in 1996 than in 1986 were found for 13-year-old students studying life science.
- Between 1986 and 1996, increases were observed in the percentages of 17-year-old students who had taken biology and chemistry. At the same time, no significant differences were found in the percentages taking general science or physics. Between 1986 and 1996, average score increases were found for 17-year-old students who had taken general science and biology, but no significant differences were observed among those taking chemistry or physics.
- In 1996, the percentage of age 17 male and female students taking biology and chemistry had increased since 1986, as had the percentage of females taking physics. No significant percentage increases were observed in general science course taking for either group. In 1996, a higher percentage of female than male students reported taking biology and chemistry. The percentage of male students taking physics was higher than for females.
- Between 1986 and 1996, average score increases were observed for female students taking general science, biology, and physics. No significant increases in performance were found for male students.
- Among White 17-year-olds, a greater percentage reported taking biology in 1996 than in 1986. The percentage of Black and Hispanic students taking biology did not change significantly during this time period. For all three racial groups, a higher percentage of students in 1996 than in 1986 reported taking chemistry. No significant changes were observed for physics, however. For White students, average science scores among students taking biology and general science increased between 1986 and 1996. The performance of

Black students taking physics also rose over this time period. No significant score improvements at any level of course work were observed for Hispanic students. White students had higher average science scores than their Black and Hispanic peers at each level of course work.

- Few significant differences between 1977 and 1996 were observed in 13- and 17-year-olds' attitudes about the value of science. The percentage of 17-year-olds who agreed that science should be required in school increased between 1977 and 1996, however. For both 13- and 17-year-olds, average science scores increased for those who agreed that science will be useful in the future. Scale score increases were also observed for 17-year-old students who agreed that science classes are useful in everyday life and that science should be required in school.
- The percentages of 13- and 17-year-olds who believed that science can help solve societal problems were generally higher in 1996 than in 1977, although there were some exceptions. Most notably, 13- and 17-year-olds in 1996 were less likely than those in the earlier assessment to believe that science can help prevent starvation, and 17-year-old students were less likely to believe that science can reduce overpopulation. No significant differences between 1977 and 1996 were observed in the percentage of 13-year-olds who believed that science can help reduce overpopulation, or in the percentages of 17-year-olds who agreed that science applications can help find cures for diseases and control weather.

Part II Mathematics

Introduction

In 1989, the National Council of Teachers of Mathematics (NCTM) established a set of standards for school mathematics.[1] The introduction of the NCTM standards has been a landmark in educational improvement, and since then, much attention has been given to the discipline and its role in the school curriculum. This attention has resulted in the reworking of school curricula and teaching programs, increased focus on faculty development in mathematics, and advances in assessing student progress in the subject.[2] As we approach the year 2000, eyes are beginning to focus on what effects, if any, these efforts have had on student achievement and improved practices in the classroom.

The 1996 NAEP long-term trend assessment in mathematics is one of many programs that can shed light on these questions. This program, initiated in 1973, provides a baseline look at long-term trends in student mathematics performance, as well as students' experiences related to mathematics learning. The NAEP 1996 long-term trend assessment in mathematics was the eighth of its kind, with previous assessments conducted in the 1972-73, 1977-78, 1982-83, 1985-86, 1989-90, 1991-92, and 1993-94 school years.[3] Each of these mathematics assessments, which will subsequently be referred to by the last half of the school year in which it occurred, involved a nationally representative sample of 9-, 13-, and 17-year-old students. It should be noted that some of the analyses reported in this section, including data on students' experiences in mathematics, do not go back to the first mathematics trend assessment because the data are not available.

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[1] National Council of Teachers of Mathematics (1989). *Curriculum and evaluation standards for school mathematics.* Reston, VA.

[2] Garet, M. S., & Mills, V. L. (1995). Changes in teaching practices: The effects of the curriculum and evaluation standards. *Mathematics Teacher, 88,* 380-388.

Joyner, J. M. (1995). Implementing the assessment standards for school mathematics: NCTM's assessment standards: A document for all educators. *Teaching Children Mathematics, 2,* 20-22.

Lindquist, M. M. (1993). Tides of change: Teachers at the helm. *Arithmetic Teacher, 41,* 64-68.

[3] Campbell, J. R., Reese, C. M., O'Sullivan, C. Y., & Dossey, J. A. (1996). *NAEP 1994 trends in academic progress.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

The NAEP Long-Term Trend Mathematics Assessment

The National Assessment of Educational Progress conducts two different kinds of assessments in mathematics: main NAEP and long-term trend. Unlike the main NAEP mathematics assessments that collect national data for students in grades 4, 8, and 12 and state data for grades 4 and 8,[4] the long-term trend assessments replicate NAEP's initial data-gathering process of sampling students from across the country at ages 9, 13, and 17. Another difference is that the mathematics long-term trend assessments employ a different set of questions, reflecting a more limited view of the curriculum than the questions newly developed for the 1990, 1992, and 1996 main NAEP national- and state-level mathematics assessments.[5] These newly developed assessments focus more heavily on students' performance and associated achievement levels related to the use of manipulatives and performance on constructed-response questions. They also contain extended sets of background questions concerning the context of students' mathematics learning experience both in and out of school. Because the content of the main NAEP mathematics series differs from that of the long-term trend assessment, and because the populations differ due to the age-versus-grade sampling methods, the results of the two assessments are not directly comparable.

The present work provides a supporting picture of school achievement in a time of reform and change. While the main assessments associated with the national- and state-level NAEP work provide a glimpse of change and progress by grade levels, the long-term trend studies provide a picture of how 9-, 13-, and 17-year-old students are performing on a set of questions developed to measure long-held objectives for school mathematics. These mathematics objectives were set in the late 1960s. Today, they represent a somewhat constrained view of mathematics. As a result, the assessment is more heavily weighted toward students' knowledge of basic facts and the ability to carry out numerical algorithms using paper and pencil, exhibit knowledge of basic measurement formulas as they are applied in geometric settings, and complete questions reflecting the direct application of mathematics to daily-living skills (such as those related to time and money). During this time of change and reform in the mathematics curriculum,[6] when classrooms may be placing more emphasis on processes such as problem solving and communication mathematics, the NAEP long-term trend assessment's results provide an index of whether students are losing ground with respect to long-held goals. The long-term trend for the three age groups indicates that, although curriculum goals have been altered to focus more heavily on problem solving, conceptual development, reasoning, and communication skills, there has been no downward movement in student performance on questions designed to measure more traditional procedural aspects of the mathematics curriculum.

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[4] Reese, C. M., Miller, K. E., Mazzeo, J., & Dossey, J. A. (1997). *NAEP 1996 mathematics report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office

[5] National Assessment of Educational Progress (1988). *Mathematics objectives: 1990 assessment.* Princeton, NJ.

National Assessment Governing Board (1995). *Mathematics framework for the 1996 national assessment of educational progress.* Washington, DC.

[6] National Council of Teachers of Mathematics (1989). *Curriculum and evaluation standards for school mathematics.* Reston, VA.

The computational focus of the long-term trend assessment also provides an anchor for how well our students are measuring up to traditional procedural skills as the calculator plays an increasingly greater role in the mathematics curriculum from kindergarten through the undergraduate level. Calculators are allowed for a few questions on the long-term trend assessment, but most questions are multiple-choice and are completed without the use of a calculator.

Analysis Procedures

The results from the eight NAEP long-term trend assessments in mathematics provide a wide range of information about how students' performance has changed during the 23-year period from 1973 to 1996. Estimates of average student performance in the mathematics trend assessments were calculated using analysis techniques based on item response theory (IRT). The NAEP mathematics scale, which ranges from 0 to 500, provides a common metric for comparing average performance across trend assessments, age groups, and demographic subpopulations. NAEP has also developed descriptions for student performance at five levels on the scale:

Level 150 – Simple Arithmetic Facts;

Level 200 – Beginning Skills and Understandings;

Level 250 – Basic Operations and Beginning Problem Solving;

Level 300 – Moderately Complex Procedures and Reasoning; and

Level 350 – Multistep Problem Solving and Algebra.

NAEP reports the performance of groups and subgroups of students, not individuals. The measures of achievement included in this report are the average performance of groups of students on the NAEP mathematics scale. Because the average scale scores and the percentages are based on samples of students and are subject to sampling and measurement error, standard errors are included with the results presented here.

The 1996 assessment was statistically compared to two previous assessments: the prior assessment in 1994, and the first assessment which provided sufficient data on the variables being tested (i.e., the base year). The purpose of year-to-year statistical tests was to determine whether the results in the 1996 assessment were different from the results of the previous assessment or whether any changes had taken place since the base year assessment. Tests of other year-to-year comparisons can be found in previous reports of NAEP long-term trend assessments.

In addition to comparisons between individual assessment years, a second test of significance was conducted to detect statistically significant linear and quadratic trends across assessments. (See the Procedural Appendix for a discussion of the procedure.) This type of analysis makes it possible to discuss statistically significant patterns that may be missed by year-to-year comparisons. For example, from assessment to assessment, students' average scale scores may consistently increase (or decrease) by a small amount. Although these small increases (or decreases) between years may not be statistically significant under pairwise multiple comparisons, the overall increasing (or decreasing) trend in average scores may be statistically significant and noteworthy. The purpose of trend tests was to determine whether the results of the series of assessments could be generally characterized by a line or a simple curve. A linear trend tests for cumulative change over the entire assessment period, such as an increase or decrease at a relatively constant rate. Simple curvilinear (i.e., quadratic) relationships represent more complex patterns. Two examples of such patterns include initial score declines over part of the time period followed by subsequent increases in more recent assessments, or a pattern of initial score increases over a time period followed by a period of relatively stable performance.

This Section

The two chapters in Part II concentrate on different aspects of student performance. Trends in average mathematics scale scores for the nation and demographic subpopulations are reported in Chapter 3. Also included are definitions of levels of mathematics performance and information on the percentages of students attaining successive levels in each assessment. Chapter 4 summarizes trends in students' responses to questions relating to school and home contexts for learning mathematics such as classroom activities, course taking, amount of time spent doing homework, and attitudes about mathematics. Results contained in Chapter 4 were based on the 1996 and base year assessments.

In Chapter 3, the results of statistical tests conducted to determine significant differences between 1996 and the first assessment year, and between 1996 and 1994, are indicated in grids that appear next to or below the figures and tables. The results from tests comparing the base year and 1996 assessments are summarized in the column labeled with the asterisk symbol "*." Significant differences are denoted with a "+" or "-" sign indicating that the 1996 average score was either greater than or less than the base year score, respectively. Similarly, significant differences between the 1994 and 1996 assessment results are denoted with a "+" or "–" sign under the column labeled with the dagger symbol "‡" indicating that the 1996 average score was either greater or smaller than the 1994 average, respectively. The results from the linear and quadratic trend tests are summarized in the columns labeled "L" and "Q," respectively. Within each column, significant positive trends are denoted by a "+" sign and significant negative trends are denoted with a "-" sign. In Chapter 4, where only the first and most recent assessment results are presented, significant differences between the base year and 1996 are indicated within the tables. All of the differences and trend patterns discussed in this report are statistically significant at the .05 level.

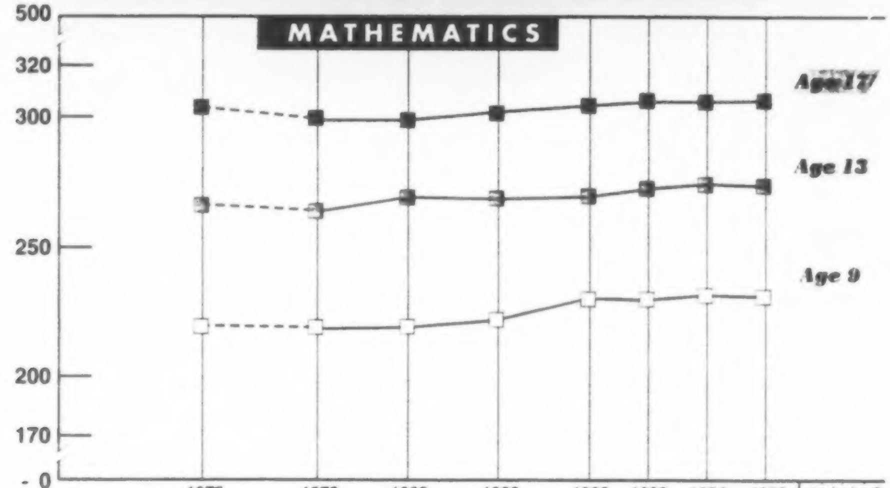
Chapter 3

Mathematics Scores for the Nation and Selected Subpopulations

Results for the Nation from 1973 to 1996

Figure 3.1 displays trends in average mathematics scores from 1973 to 1996 for 9-, 13-, and 17-year-old students in the United States. The patterns of change, except for the dotted lines between 1973 and 1978, are based on recent scaling analyses developed to provide valid pictures of trends in the data. The dotted lines represent results for the 1973 assessment that were extrapolated from previous NAEP analyses. (The Procedural Appendix provides details about the scaling methodology and information about drawing inferences from the trend analyses.) This figure provides the overall trend in students' knowledge of mathematics over the past 23 years for specific age groups.

Figure 3.1 Trends in Average Mathematics Scale Scores for the Nation, 1973 to 1996



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	304(1.1)	300(1.0)	299(0.9)	302(0.9)	305(0.9)	307(0.9)	306(1.0)	307(1.2)			+	+
Age 13	266(1.1)	264(1.1)	269(1.1)	269(1.2)	270(0.9)	273(0.9)	274(1.0)	274(0.8)	+		+	
Age 9	219(0.8)	219(0.8)	219(1.1)	222(1.0)	230(0.8)	230(0.8)	231(0.8)	231(0.8)	+		+	+

Standard errors of the estimated scale scores appear in parentheses. [– – –] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1973.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Seventeen-year-olds. Among 17-year-olds, a decline in the average mathematics score was observed between 1973 and 1982. Gains have been made since that time however, and the overall pattern was one of increased performance. Despite these gains, the average score in 1996 was not significantly different from the average scores in 1973 or 1994.

Thirteen-year-olds. Thirteen-year-olds displayed an overall pattern of improved performance from 1973 to 1996 that resulted in a 1996 average score that was higher than the 1973 average score. There has been no significant change since 1994.

Nine-year-olds. The average mathematics scores for 9-year-old students were somewhat stable from 1973 to 1982, but increased after that time. The overall trend was one of improved performance, and the average score in 1996 was higher than the average score in 1973, but not significantly different from the 1994 average.

National Trends in Levels of Mathematics Performance from 1978 to 1996

To better understand trends in students' knowledge and skills in mathematics, levels of mathematics performance were created to illuminate the nature of any changes. Five levels were established by "anchoring" five points on the NAEP mathematics scale: 150, 200, 250, 300, and 350.[7] The anchoring was accomplished by determining which questions students performing at one point on the scale were more likely to answer correctly than students performing at the next lower level. Mathematics educators from schools and universities then carefully studied the sets of questions that make up the assessments to develop descriptions for the five levels. These descriptions outline the concepts, procedures, and processes associated with correct responses to the questions at each level. Figure 3.2 provides these descriptions for the five anchor levels.

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[7] In theory, performance levels above 350 and below 150 could have been defined; however, so few students in the assessment performed at the extreme ends of the mathematics scale that it was not practical to do so.

Figure 3.2 Levels of Mathematics Performance

Level 350:

Multistep Problem Solving and Algebra

Students at this level can apply a range of reasoning skills to solve multistep problems. They can solve routine problems involving fractions and percents, recognize properties of basic geometric figures, and work with exponents and square roots. They can solve a variety of two-step problems using variables, identify equivalent algebraic expressions, and solve linear equations and inequalities. They are developing an understanding of functions and coordinate systems.

Level 300:

Moderately Complex Procedures and Reasoning

Students at this level are developing an understanding of number systems. They can compute with decimals, simple fractions, and commonly encountered percents. They can identify geometric figures, measure lengths and angles, and calculate areas of rectangles. These students are also able to interpret simple inequalities, evaluate formulas, and solve simple linear equations. They can find averages, make decisions based on information drawn from graphs, and use logical reasoning to solve problems. They are developing the skills to operate with signed numbers, exponents, and square roots.

Level 250:

Numerical Operations and Beginning Problem Solving

Students at this level have an initial understanding of the four basic operations. They are able to apply whole number addition and subtraction skills to one-step word problems and money situations. In multiplication, they can find the product of a two-digit and a one-digit number. They can also compare information from graphs and charts, and are developing an ability to analyze simple logical relations.

Level 200:

Beginning Skills and Understandings

Students at this level have considerable understanding of two-digit numbers. They can add two-digit numbers but are still developing an ability to regroup in subtraction. They know some basic multiplication and division facts, recognize relations among coins, can read information from charts and graphs, and use simple measurement instruments. They are developing some reasoning skills.

Level 150:

Simple Arithmetic Facts

Students at this level know some basic addition and subtraction facts, and most can add two-digit numbers without regrouping. They recognize simple situations in which addition and subtraction apply. They also are developing rudimentary classification skills.

The percentages of students at ages 9, 13, and 17 reaching the various performance levels in each of the NAEP long-term trend assessments are shown in Table 3.1.[8] Because these analyses were not possible for data collected for the 1973 mathematics assessment, the results are presented for the 1978 through the 1996 assessments only. (Performance level data are not available for assessment years with extrapolated data.) Data on performance levels by gender, race/ethnicity, modal grade, region, parents' education level, type of school, and quartiles can be found in the Data Appendix.

Table 3.1

Trends in Percentage of Students At or Above Five Mathematics Performance Levels, 1978 to 1996

		Assessment Years										
Performance Levels	**Age**	**1978**	**1982**	**1986**	**1990**	**1992**	**1994**	**1996**	*****	**‡**	**L**	**Q**
Level 350 Multistep Problem Solving and Algebra	9	0 (***)	0 (***)	0 (***)	0 (***)	0 (***)	0 (***)	0 (***)				
	13	1 (0.2)	1 (0.1)	0 (0.1)	0 (0.1)	0 (0.2)	1 (0.2)	1 (0.1)				+
	17	7 (0.4)	6 (0.4)	7 (0.5)	7 (0.6)	7 (0.6)	7 (0.8)	7 (0.8)				
Level 300 Moderately Complex Procedures and Reasoning	9	1 (0.1)	1 (0.1)	1 (0.2)	1 (0.3)	1 (0.3)	1 (0.4)	2 (0.3)	+		+	
	13	18 (0.7)	17 (0.9)	16 (1.0)	17 (1.0)	19 (1.0)	21 (1.4)	21 (1.2)			+	+
	17	52 (1.1)	49 (1.3)	52 (1.4)	56 (1.4)	59 (1.3)	59 (1.4)	60 (1.7)	+		+	
Level 250 Numerical Operations and Beginning Problem Solving	9	20 (0.7)	19 (1.0)	21 (0.9)	28 (0.9)	28 (0.9)	30 (1.1)	30 (1.0)	+		+	
	13	65 (1.2)	71 (1.2)	73 (1.6)	75 (1.0)	78 (1.1)	78 (1.1)	79 (0.9)	+		+	
	17	92 (0.5)	93 (0.5)	96 (0.5)	96 (0.5)	97 (0.5)	97 (0.5)	97 (0.4)	+		+	–
Level 200 Beginning Skills and Understandings	9	70 (0.9)	71 (1.2)	74 (1.2)	82 (1.0)	81 (0.8)	82 (0.7)	82 (0.8)	+		+	
	13	95 (0.5)	98 (0.4)	99 (0.2)	99 (0.2)	99 (0.3)	99 (0.3)	99 (0.2)	+		+	–
	17	100 (0.1)	100 (0.0)	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)				
Level 150 Simple Arithmetic Facts	9	97 (0.3)	97 (0.3)	98 (0.3)	99 (0.2)	99 (0.2)	99 (0.2)	99 (0.2)	+		+	
	13	100 (0.1)	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)				
	17	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)				

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[8] The performance levels are based upon a vertical scale that assumes knowledge is cumulative. Younger students are not expected to have the same amount of knowledge as older students. Therefore, most 9-year-olds are not expected to reach the upper levels of performance.

Level 350: In 1996, about 1 percent of 13-year-olds and 7 percent of 17-year-olds attained this highest level of performance in 1996, characterized by the ability to apply a range of reasoning skills to multistep problems. Despite the small fluctuations in percentages among 13-year-olds, the 1996 and 1978 percentages did not differ significantly. Similarly, the percentage of 17-year-olds reaching this level in 1996 did not differ from that in 1978.

Level 300: Compared with those in the lower levels, students performing at or above Level 300 demonstrated better numerical operations and logical reasoning and were able to draw from a wider range of mathematical areas, including algebra and geometry. A higher percentage of age 9 students attained this level in 1996 than in 1978. Despite the small changes over time, the overall pattern was one of increasing percentages. At age 13, the percentage of students reaching this level declined from 1978 to 1986 but subsequently increased. Although the overall trend was one of increased percentages, the percentage in 1996 was not significantly different from that in 1978. The overall trend for 17-year-olds was one of increasing percentages. Sixty percent of 17-year-olds performed at or above this level in 1996, which represented an increase over the percentage in 1978.

Level 250: Students performing at or above Level 250 had developed an understanding of the four basic operations and were beginning to acquire more developed reasoning skills. Thirty percent of 9-year-olds, 79 percent of 13-year-olds, and nearly all 17-year-olds (97 percent) attained this level in 1996. For all three age groups, the percentage in 1996 was higher than that in 1978 and the trend showed an overall pattern of increase. Among 17-year-olds, the gains occurred during the 1980s.

Level 200: Students performing at or above Level 200 demonstrated a greater range and depth of basic mathematical skills than did those who reached only Level 150, but were still developing a grasp of multiplication and division and reasoning ability beyond that required by simple numerical computations. In each assessment since 1978, virtually all 17-year-olds have reached this level. For 9- and 13-year-olds, gains were observed in the 1980s followed by a period of relative stability in the 1990s. About 99 percent of 13-year-olds attained this level in 1996, which was an increase over the percentage in 1978. With 82 percent reaching this level in 1996, age 9 students also showed improvement since 1978.

Level 150: In 1996, nearly all students in each of the three age groups understood simple arithmetic facts as described in Level 150. Despite the small changes for 9-year-olds, percentages increased overall, and the 1996 percentage was higher than the 1978 percentage.

Trends in Mathematics Scale Scores by Quartile from 1978 to 1996

Figure 3.3 presents trends in mathematics scale scores for 9-, 13-, and 17-year-old students who were in the upper quartile (upper 25 percent), middle two quartiles (middle 50 percent), and the lower quartile (lower 25 percent) of student performance in each assessment. Note that these trends are not extrapolated back to 1973. As would be expected, standard errors are generally smaller for these more homogeneous groups than for the total group.

Analyses by quartiles provide information on trends in mathematics scores for students at the upper as well as the lower points along the distribution of scores. These analyses demonstrate whether overall gains or losses were evident across the full range of student performance in mathematics or were particular to certain achievement groups. The overall results are promising with respect to one objective of the third goal of The National Education Goals, which states that "the academic performance of elementary and secondary students will increase significantly in every quartile,..."[9] The report emphasizes that students of all abilities should be granted access to educational opportunities and should demonstrate gains in educational achievement. That is, for every age group at each of the performance quartiles, the results illustrate a pattern of improved performance. This suggests that improvement on the trend mathematics assessments has not been limited to a particular segment of the performance distribution.

The trend for each quartile group among 17-year-olds was one of overall improvement. For each quartile group, the average score in 1996 was higher than in 1978. Average scores for students in the upper and lower quartiles showed an increasing trend across the assessments. For 17-year-olds in the middle two quartiles, scores decreased in 1982, but then increased until 1992.

The average score of 13-year-olds in the upper quartile changed little from 1978 through the 1980s, but increased in the 1990s. The overall trend was one of improved performance, and the average score in 1996 was higher than the average in 1978. Among 13-year-olds in the middle two quartiles, average scores showed an overall pattern of improvement across the assessment years. The average score in 1996 was higher than in 1978. In the lower quartile of performance among 13-year-olds, average scores rose between 1978 and 1982, and then displayed a trend of small increases across the assessments. In general, the pattern showed overall improvement with higher scores in 1996 than in 1978.

An overall pattern of increased performance was observed for 9-year-olds in each performance range. All average scores for the three quartile groups were higher in 1996 than in 1978.

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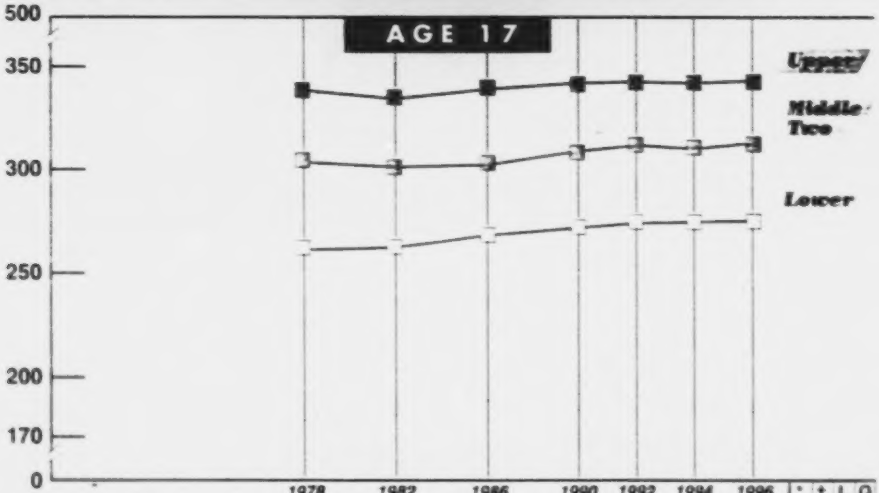
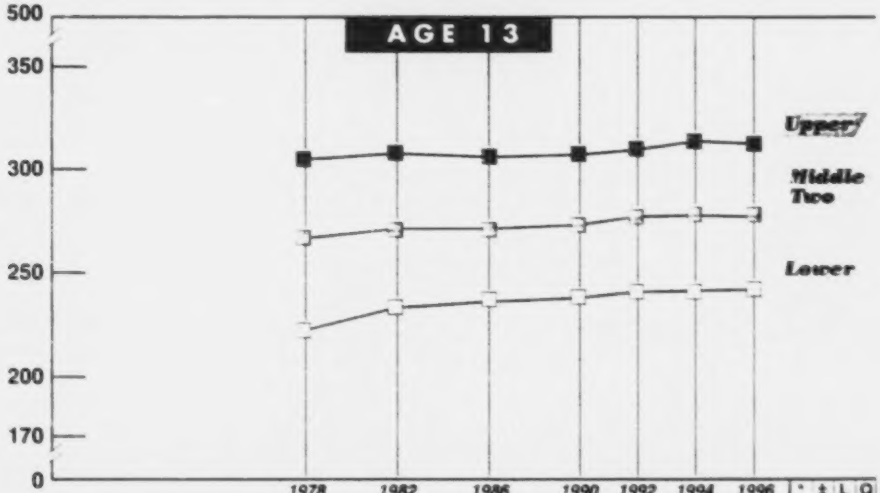
[9] National Education Goals Panel (1996). *The national education goals report: Building a nation of learners.* Washington, DC: U.S. Government Printing Office.

Figure 3.3 Trends in Average Mathematics Scale Scores by Quartile, 1978 to 1996



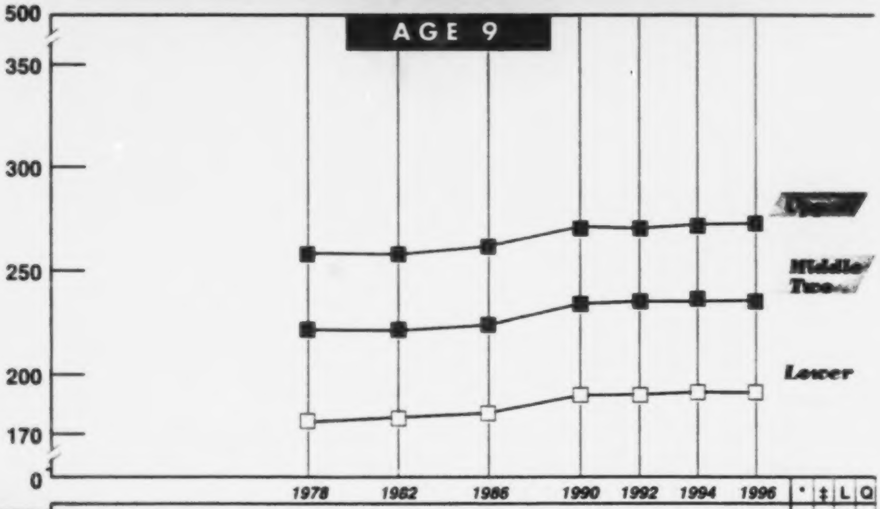
	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	339(0.4)	336(0.6)	340(0.7)	341(0.8)	342(0.7)	342(1.1)	342(1.0)	+		+	
Middle Two	302(0.3)	299(0.3)	301(0.5)	305(0.5)	308(0.4)	307(0.4)	308(0.7)	+		+	+
Lower Quartile	260(0.5)	260(0.7)	265(0.9)	268(0.9)	270(0.9)	270(0.8)	270(0.9)	+		+	



	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	305(0.6)	306(0.7)	306(0.7)	307(0.6)	309(0.6)	312(0.9)	311(1.0)	+		+	+
Middle Two	266(0.4)	269(0.3)	269(0.5)	271(0.4)	274(0.4)	275(0.5)	275(0.5)	+		+	
Lower Quartile	221(0.7)	230(0.8)	233(0.7)	234(0.8)	236(1.2)	236(1.0)	237(0.5)	+		+	−

Figure 3.3
(continued)

Trends in Average Mathematics Scale Scores by Quartile, 1978 to 1996



	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
[illegible]	256(0.8)	256(0.6)	259(0.7)	266(0.8)	266(0.8)	267(0.8)	268(1.2)	+		+	
Middle Two	221(0.5)	221(0.5)	223(0.5)	231(0.4)	232(0.5)	233(0.6)	232(0.4)	+		+	
Lower Quartile	178(0.6)	179(0.8)	181(0.7)	190(1.0)	190(0.8)	191(0.8)	191(0.9)	+		+	

Standard errors of the estimated scale scores appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Mathematics Scale Scores by Race/Ethnicity from 1973 to 1996

Displayed in Figure 3.4 are the trends in average mathematics scores for White, Black, and Hispanic students from 1973 to 1996.[10]

White Students. The average score for White 17-year-olds declined between 1973 and 1982, but has increased since that time. Despite an overall positive trend, the average score in 1996 was not significantly higher than it was 23 years earlier. Thirteen-year-old White students displayed a general pattern of increased performance across the assessment years, with the exception of a small decrease in 1978. The average score for White 9-year-old students remained relatively stable from 1973 to 1982, increased until 1990, but has changed little since that time. However, the overall trend was one of increased performance. The 1996 average scores for both 9- and 13-year-old White students were higher than in 1973.

Black Students. For Black students at all three age groups, trend analyses revealed a pattern of overall gains in mathematics across the assessment years. For 13-year-olds, average scores have changed little since 1986. However, the average scores for each age group in 1996 were higher than those in 1973.

Hispanic Students. For 17-year-old Hispanic students, scores were relatively stable in the 1970s, rose between 1982 and 1992, then stabilized. The overall trend was positive, and the average score in 1996 was greater than that in 1973. Following a period of stability in the 1970s, mathematics scores rose dramatically in 1982 for 13-year-old Hispanic students, and then remained relatively stable. The overall pattern was one of increased performance across the assessment years, and the 1996 average was greater than the 1973 average. The average scores of 9-year-old Hispanic students indicate improved performance over the 23-year assessment period. The average score in 1996 was higher than in 1973.

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[10] For Asian/Pacific Islander students and American Indian students, the sample sizes were insufficient to permit reliable trend estimates.

Figure 3.4 Trends in Average Mathematics Scale Scores by Race/Ethnicity, 1973 to 1996

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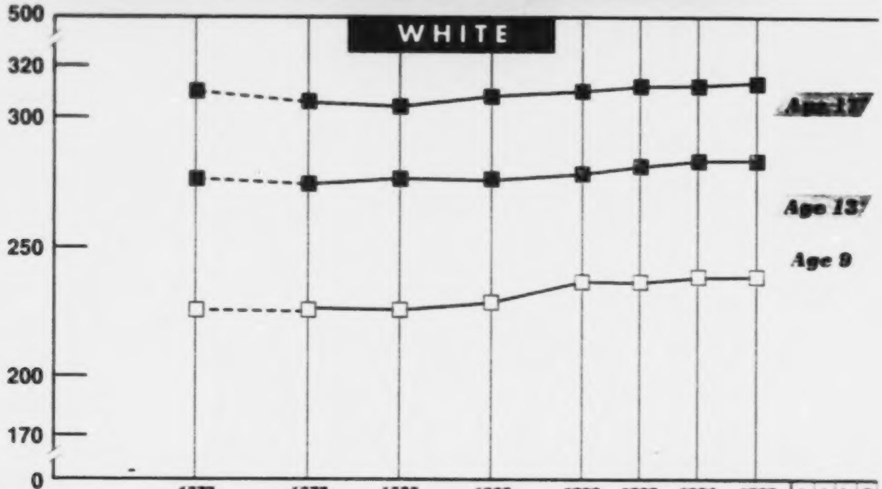
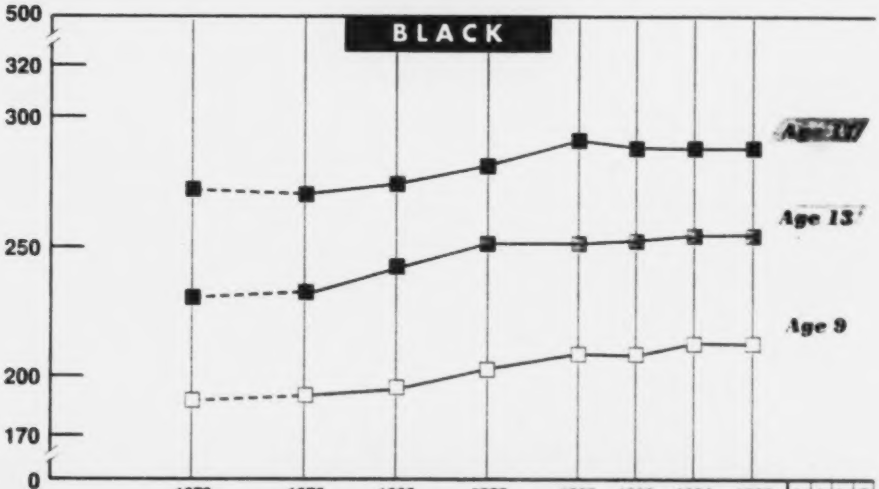


	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
[illegible]	310(1.1) —	306(0.9) 83(1.3)	304(0.9) 81(2.0)	308(1.0) 78(0.5)	310(1.0) 73(0.5)	312(0.8) 75(0.5)	312(1.1) 72(0.5)	313(1.4) 71(0.6)			+	+
Age 13	274(0.9) —	272(0.8) 80(1.7)	274(1.0) 79(2.1)	274(1.3) 77(1.0)	276(1.1) 73(0.7)	279(0.9) 74(0.5)	281(0.9) 73(0.5)	281(0.9) 71(0.6)	+		+	+
Age 9	225(1.0) —	224(0.9) 79(1.4)	224(1.1) 79(2.5)	227(1.1) 77(1.1)	235(0.8) 75(1.1)	235(0.8) 75(0.9)	237(1.0) 75(0.7)	237(1.0) 72(1.1)	+		+	+



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	270(1.3) —	268(1.3) 12(1.1)	272(1.2) 13(1.7)	279(2.1) 14(0.3)	289(2.8) 16(0.3)	286(2.2) 15(0.3)	286(1.8) 16(0.3)	286(1.7) 15(0.3)	+		+	
Age 13	228(1.9) —	230(1.9) 13(1.5)	240(1.6) 14(1.8)	249(2.3) 14(0.9)	249(2.3) 16(0.3)	250(1.9) 16(0.3)	252(3.5) 15(0.3)	252(1.3) 15(0.4)	+		+	–
Age 9	190(1.8) —	192(1.1) 14(1.4)	195(1.6) 14(2.0)	202(1.6) 15(0.5)	208(2.2) 16(0.7)	208(2.0) 16(0.4)	212(1.6) 15(0.5)	212(1.4) 16(0.5)	+		+	

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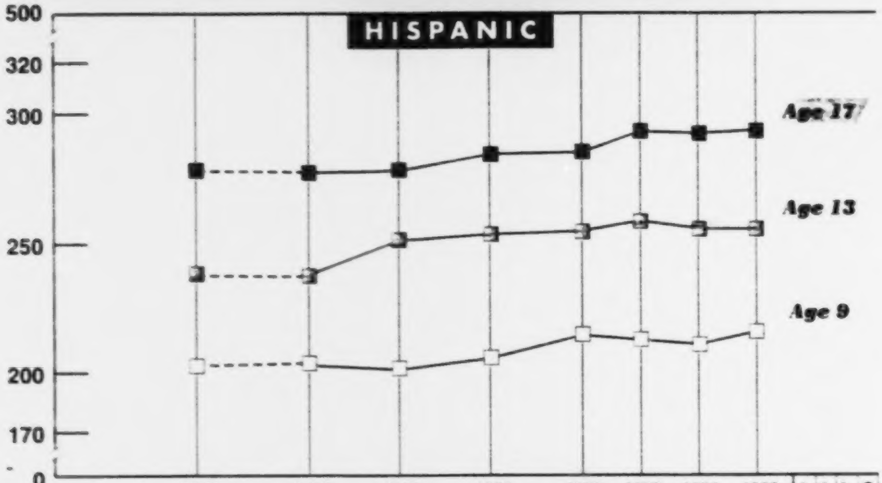
Figure 3.4
(continued)

Trends in Average Mathematics Scale Scores by Race/Ethnicity, 1973 to 1996



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	277(2.2) —	276(2.3) 4(0.5)	277(1.8) 5(1.0)	283(2.9) 6(0.3)	284(2.9) 7(0.4)	292(2.6) 7(0.5)	291(3.7) 9(0.3)	292(2.1) 9(0.7)	+		+	+
Age 13	239(2.2) —	238(2.0) 6(0.9)	252(1.7) 5(1.2)	254(2.9) 7(1.1)	255(1.8) 7(0.5)	259(1.8) 7(0.5)	256(1.9) 8(0.4)	256(1.6) 9(0.7)	+		+	–
Age 9	202(2.4) —	203(2.2) 5(0.7)	204(1.3) 5(1.1)	205(2.1) 6(1.1)	214(2.1) 6(0.6)	212(2.3) 6(0.8)	210(2.3) 6(0.4)	215(1.7) 8(1.0)	+		+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

[– – –] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1973.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

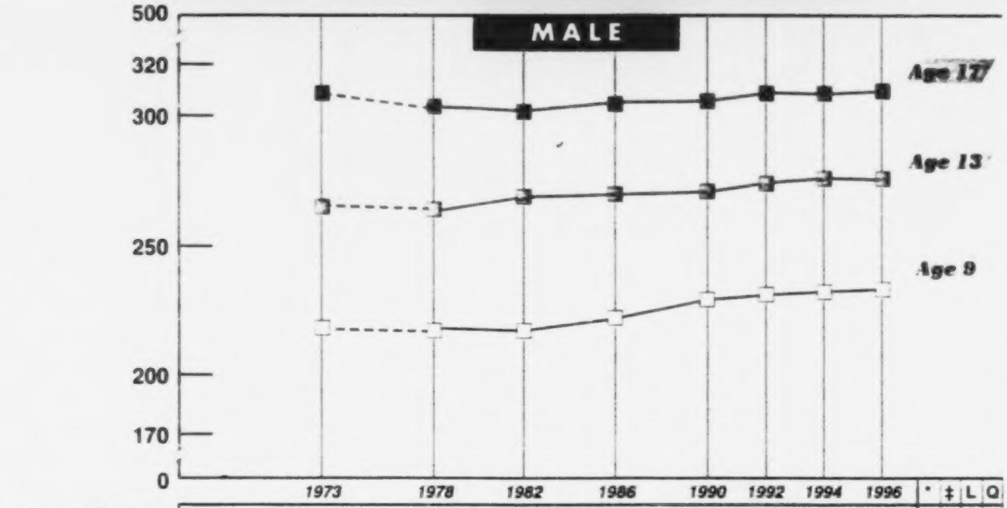
Trends in Mathematics Scale Scores by Gender from 1973 to 1996

Figure 3.5 presents trends in average mathematics scale scores by gender.

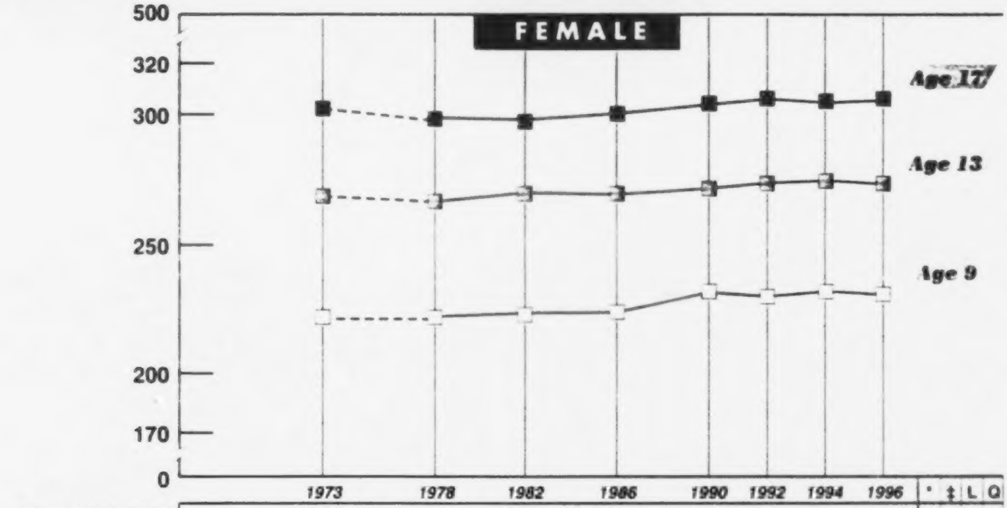
Male Students. During the 1970s and early 1980s, mathematics performance among 17-year-old males declined, but then followed a pattern of increases beginning in 1986. Although the overall pattern of scores showed gains being made, the average score in 1996 was not significantly different from that in 1973. Among 13-year-old males, average scores showed an overall trend of increased performance. Nine-year-old males showed a pattern of stability from 1973 to 1982, followed by score increases in 1986 and 1990, and then small improvements until 1996. The result was a general trend toward higher average scores. For both 9- and 13-year-olds, average mathematics performance in 1996 was above that in 1973.

Female Students. At age 17, female students demonstrated a pattern of declining scores between 1973 and 1982, followed by a recovery period and relative stability in the 1990s. Although the overall trend was positive, the 1996 average score was not significantly different from the 1973 average score. The overall pattern for 13-year-old females showed improvement across the assessment years and resulted in an average score in 1996 that was higher than in 1973. Among female students, the average score for 9-year-olds was relatively consistent through the 1970s and 1980s, then increased in 1990 and has changed little since then. Overall, the pattern was one of improved performance, and the 1996 average score was higher than in 1973.

Figure 3.5 Trends in Average Mathematics Scale Scores by Gender, 1973 to 1996



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	309(1.2) —	304(1.0) 49(0.5)	302(1.0) 49(0.6)	305(1.2) 49(1.2)	306(1.1) 49(0.9)	309(1.1) 51(1.2)	309(1.4) 50(1.3)	310(1.3) 50(1.2)			+	+
Age 13	265(1.3) —	264(1.3) 50(0.5)	269(1.4) 50(0.4)	270(1.1) 50(0.9)	271(1.2) 50(0.6)	274(1.1) 50(0.8)	276(1.3) 49(0.8)	276(0.9) 48(0.8)	+		+	
Age 9	218(0.7) —	217(0.7) 50(0.5)	217(1.2) 49(0.6)	222(1.1) 50(0.6)	229(0.9) 49(0.6)	231(1.0) 49(0.6)	232(1.0) 49(0.8)	233(1.2) 50(0.6)	+		+	+



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	301(1.1) —	297(1.0) 51(0.5)	296(1.0) 51(0.6)	299(1.0) 51(1.2)	303(1.1) 51(0.9)	305(1.1) 49(1.2)	304(1.1) 50(1.3)	305(1.4) 51(1.2)			+	+
Age 13	267(1.1) —	265(1.1) 50(0.5)	268(1.1) 50(0.4)	268(1.5) 50(0.9)	270(0.9) 50(0.6)	272(1.0) 50(0.8)	273(1.0) 51(0.8)	272(1.0) 52(0.8)	+		+	
Age 9	220(1.1) —	220(1.0) 50(0.5)	221(1.2) 51(0.6)	222(1.2) 50(0.6)	230(1.1) 51(0.6)	228(1.0) 51(0.6)	230(0.9) 51(0.8)	229(0.7) 51(0.6)	+		+	+

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

[- - -] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (-) than that in 1973.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (-) than that in 1994.

L Indicates that the positive (+) or negative (-) linear trend is significant.

Q Indicates that the positive (+) or negative (-) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Trends in Differences in Average Mathematics Scale Scores by Race/Ethnicity and by Gender

The previous sections discussed trends in mathematics achievement for students in different racial/ethnic and gender groups. Previous academic assessments such as NAEP[11] have commonly found higher average achievement in mathematics for White students compared to their minority peer groups. Gender differences have been found less consistently, but tend to favor males in the higher grades. Recent analyses show that this gender gap has been reduced to about one-quarter of what it was 30 years ago.[12]

Some studies have suggested that performance gaps among student groups are due to differential course-taking and dropout rates by gender,[13] and to differences in the opportunities available to students in various racial groups. These differential opportunities include attending effective schools,[14] social and economic factors of the home and school location,[15] and encouragement given to study mathematics.[16]

These factors are consistent with other research that has used NAEP results to explore differences in performance between racial groups.[17] Recent arguments demonstrate that reporting unadjusted differences among racial groups may be misleading since these groups come from different family, school, and community contexts that are related to achievement. When achievement results are controlled for social context, test score differences between groups may be reduced.[18] Other research shows that while a substantial performance gap still exists, the performance difference between non-Hispanic White 13- and 17-year-olds and their Hispanic and Black peers has narrowed between 1975 and 1990. Gains among Black and Hispanic students, however, could not be explained by changing family characteristics (parental education level, family size, family income) alone.[19]

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[11] Campbell, J. R., Reese, C. M., O'Sullivan, C., & Dossey, J. A. (1996). *NAEP 1994 trends in academic progress.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Mullis, I. V. S., Owen, E. H., & Phillips, G. W. (1990). *Accelerating academic achievement: A summary of findings from 20 years of NAEP.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Mullis, I. V. S., Dossey, J. A., Owen, E. H., & Phillps, G. W. (1993). *NAEP 1992 mathematics report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Reese, C. M., Miller, K. E., Mazzeo, J., & Dossey, J. A. (1997). *NAEP 1996 mathematics report card for the nation and the states.* Natoinal Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[12] Willingham, W. W. & Cole, N. S. (1997). *Gender and fair asssessment.* Mahwah, NJ: Lawrence Erlbaum Associates.

[13] Meyer, M. (1989). Gender differences in mathematics. In M. M. Lindquist (Ed.), *Results from the fourth mathematics assessment of the NAEP.* Reston, VA: National Council of Teachers of Mathematics.

[14] Mullis, I. V. S., Jenkins, F., & Johnson, E. G. (1994). *Effective schools in mathematics.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[15] Oakes, J. (1990). *Multiplying inequalities: The effects of race, social class, and tracking on opportunities to learn mathematics and science.* Santa Monica, CA: RAND.

[16] Backer, A., & Akin, S. (Eds.). (1990). *Every child can succeed: Readings for school improvement.* Bloomington, IN: Agency for Instructional Television.

[17] Berends, M., & Koretz, D. M. (1995). Reporting minority students' test scores: How well can the National Assessment of Educational Progress account for differences in social context? *Educational Assessment, 3*(3), 249-285.

Jaynes, G. D., & Williams, R. M. Jr. (Eds.). (1989). *A common destiny: Blacks and American society.* Washington, DC: National Academy Press.

Grissmer, D. W., Kirby, S. N., Berends, M., & Williamson, S. (1994). *Student achievement and the changing American family.* Santa Monica, CA: Rand.

[18] Berends, M., & Koretz, D. M. op. cit.

[19] Grissmer, D. W., et. al., op. cit.

The size of the gap between various student groups and the changes in these differences over time are matters of considerable public interest. Trends in score differences help shed light on whether the performance gaps between racial/ethnic and between gender groups are increasing, decreasing, or staying the same. As with past NAEP assessments, significant differences were observed in the long-term trend mathematics assessment between racial/ethnic groups and between males and females. Trends in the differences between the average mathematics scores of selected subgroups of students across the assessments are displayed in Figure 3.6.

White-Black. In 1996, the average scores of 9-, 13-, and 17-year-old White students were higher than the average scores of their Black peers. At age 17, the gap between White and Black students narrowed during the 1970s and 1980s. Although there was some evidence of widening gaps in the 1990s, the overall trend has been toward smaller gaps and, the size of the gap in 1996 was smaller than in 1973. This trend was the result of an average gain among Black students between 1973 and 1990, and somewhat stable scores during the 1990s. This stands in contrast to White 17-year-olds whose average scores fluctuated slightly between 1973 and 1990, and then increased slightly. Similar to the results for 17-year-olds, the gap between scores of White and Black 13-year-olds narrowed during the 1970s and 1980s, but has widened somewhat since that time. Nevertheless, the overall trend has been toward smaller gaps, and the size of the difference between White and Black average performance was smaller in 1996 than in 1973. This trend in score gaps may be attributed to gains made by Black 13-year-olds from 1973 to 1986, while the scores for White 13-year-olds remained somewhat stable. At age 9, the gap between White and Black students' scores generally decreased across the assessment years, and in 1996 it was smaller than the gap observed in 1973. This narrowing of the gap was the result of increases in average scores among Black students from 1973 to 1986, while the average scores of White students remained relatively stable during the same time period.

White-Hispanic. In 1996, White students outperformed Hispanic students in mathematics at all three ages. Among 17-year-olds, the overall trend shows decreasing differences between White and Hispanic students across the assessment years. The magnitude of the gap in 1996 was smaller than in 1973. At age 13, the differences between the average scores for White and Hispanic students declined until 1986 and widened somewhat in the 1990s. The overall trend was one of narrowing gaps, and the difference in average scores between White and Hispanic 13-year-olds in 1996 was smaller than in 1973. This trend resulted from average score gains among Hispanics from 1973 to 1986, while average scores for Whites remained stable during this time period. Since 1986, the average score of White 13-year-olds has increased, but the average for their Hispanic peers has remained somewhat stable. The gap between White and Hispanic 9-year-olds has remained relatively stable across the assessment years from 1973 to 1996.

Male-Female. At all three ages in 1996, male students outscored females in mathematics. The overall trend among 17-year-olds showed a narrowing of the gap, with the male advantage lessening over the years. Despite this general pattern of decreasing differences, the gender gap in 1996 was not significantly different from that in 1973. Trend analyses of the mathematics score gaps between male and female students aged 9 and 13 revealed a small, but significant shift across time. At both ages, the trend has been away from higher average scores for female students toward higher average scores for male students. However, in most of the assessment years, the average score difference between male and female students was not significant.

Figure 3.6

Trends in Differences in Average Mathematics Scale Scores by Race/Ethnicity and Gender

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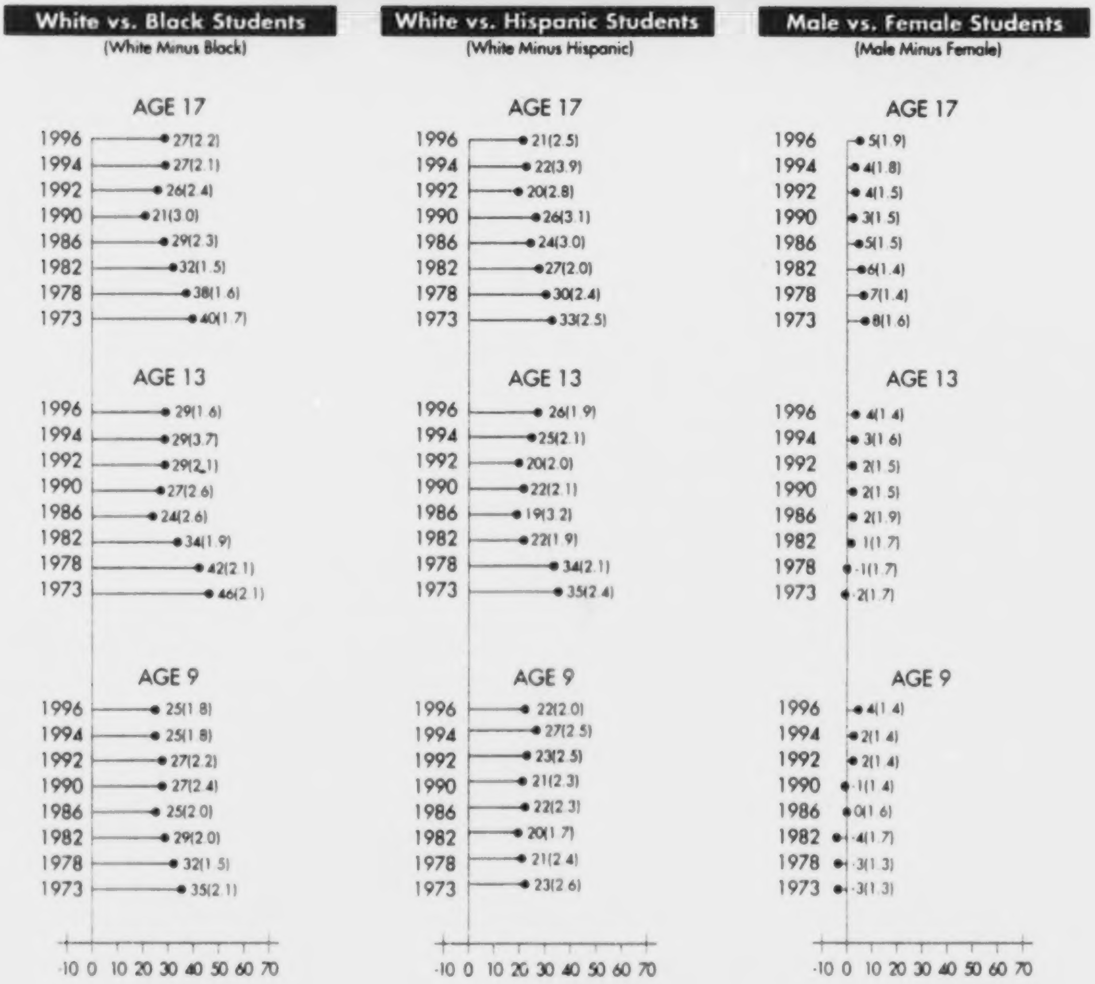

	*	‡	L	Q
Age 17	–		–	+
Age 13	–		–	+
Age 9	–		–	

	*	‡	L	Q
Age 17	–		–	
Age 13	–		–	+
Age 9				

	*	‡	L	Q
Age 17			–	
Age 13	+		+	
Age 9	+		+	

Standard errors of the estimated scale score differences appear in parentheses.

* Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1973.

‡ Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Trends in Mathematics Scale Scores by Region from 1973 to 1996

Figure 3.7 shows trends in average mathematics scale scores for each of four geographic regions of the country: Northeast, Southeast, Central, and West. These data reveal the changes that have occurred in the last 23 years for students in different areas of the country, demonstrating whether overall gains or losses in mathematics performance were similar for different geographic regions.

Northeast. Among 17-year-olds in the Northeast, average scores declined between 1973 and 1982, and then changed little until 1992 when some increase was observed. The 1996 average score for these students was not significantly different from the average in 1973. With the exception of a score increase in 1994, the overall performance of 13-year-olds has been relatively consistent across the assessment years. The 1996 average score for these students was lower than that in the previous assessment in 1994, but not significantly different from the average in 1973. Nine-year-olds showed a trend of stable performance from 1973 to 1986, followed by an increase in 1990. The overall trend for this age group was one of improved performance, and the 1996 average score was higher than in 1973.

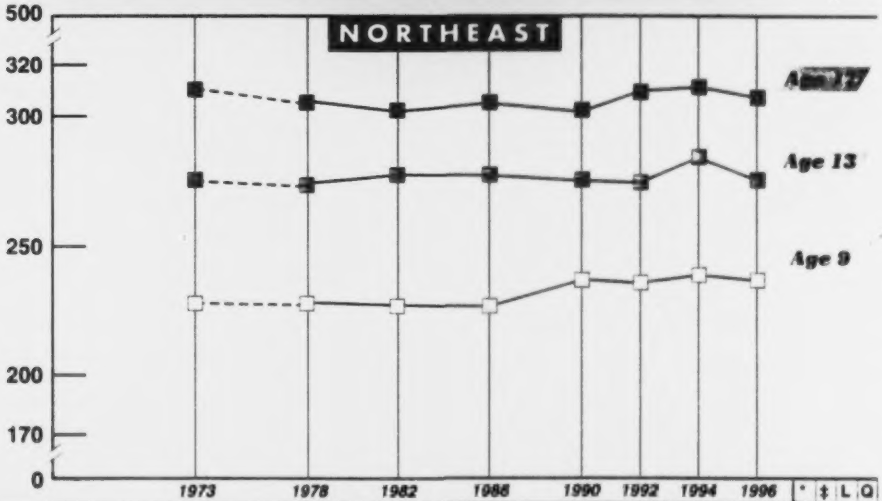
Southeast. In the Southeast, overall improvement was observed for 9-, 13-, and 17-year-olds across the assessment years. For 17-year-olds, the pattern was one of declines in performance followed by increasing scores. For all three age groups, average scores in 1996 were improved over 1973 averages.

Central. For both 9- and 17-year-olds in the Central region, average scores declined slightly during the 1970s and early 1980s, then increased, resulting in an overall pattern of increased performance and higher scores in 1996 than in 1973. Additionally, 17-year-olds showed improvement in 1996 over the previous assessment in 1994. Despite some fluctuations, the overall trend for 13-year-olds indicates improved performance across the assessment years, resulting in an average score in 1996 that was higher than the 1973 average.

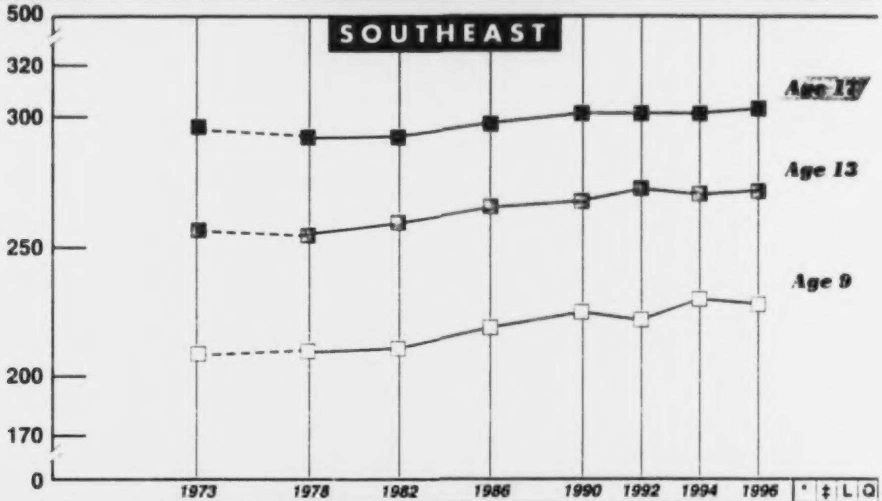
West. The performance of 17-year-olds in the West declined from 1973 to 1982, recovered somewhat in 1986, and has increased slowly since that time. Although the overall trend was positive, the average score in 1996 did not differ significantly from that in 1973. Overall improvement was observed for 9- and 13-year-olds. For both groups, average scores in 1996 were higher than those in 1973.

Comparisons of 1996 average mathematics scores for the four regions revealed several differences. At age 9, students in the Northeast had higher average scores than students in the Southeast and Western regions. At ages 13 and 17, students in the Central region outscored their peers in the Southeast and West.

Figure 3.7 Trends in Average Mathematics Scale Scores by Region, 1973 to 1996



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	312(1.8) —	307(1.8) 23(2.0)	304(2.0) 24(2.8)	307(1.9) 24(0.8)	304(2.1) 22(1.0)	311(2.0) 22(0.9)	313(2.9) 23(1.0)	309(3.0) 23(2.7)				+
Age 13	275(2.4) —	273(2.4) 23(2.2)	277(2.0) 24(2.5)	277(2.2) 22(1.6)	275(2.3) 24(1.0)	274(2.2) 21(0.8)	284(1.5) 20(0.9)	275(2.1) 22(2.0)		–		
Age 9	227(1.9) —	227(1.9) 22(2.5)	226(1.8) 21(2.7)	226(2.7) 21(1.1)	236(2.1) 23(0.9)	235(1.9) 21(1.2)	238(2.2) 22(0.9)	236(2.0) 22(2.3)	+		+	+



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	296(1.8) —	292(1.7) 22(2.1)	292(2.1) 20(2.1)	297(1.4) 23(2.3)	301(2.3) 24(0.9)	301(1.9) 25(1.4)	301(1.6) 25(1.5)	303(2.1) 22(2.9)	+		+	+
Age 13	255(3.2) —	253(3.3) 23(2.0)	258(2.2) 23(2.2)	264(1.4) 25(5.8)	266(1.9) 23(0.8)	271(2.5) 24(1.6)	269(2.0) 22(1.7)	270(1.8) 25(2.6)	+		+	
Age 9	208(1.3) —	209(1.2) 24(2.1)	210(2.5) 24(2.7)	218(2.5) 23(4.7)	224(2.4) 24(0.9)	221(1.7) 24(1.3)	229(1.4) 24(1.5)	227(2.0) 23(2.6)	+		+	

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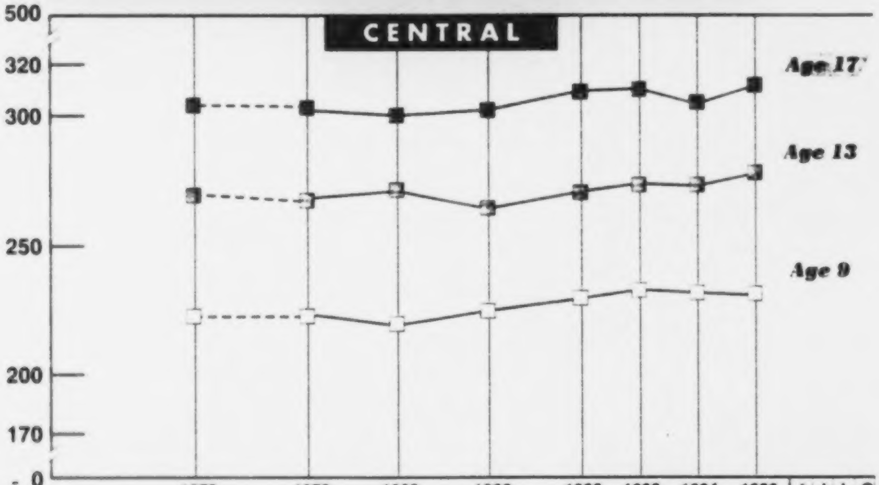
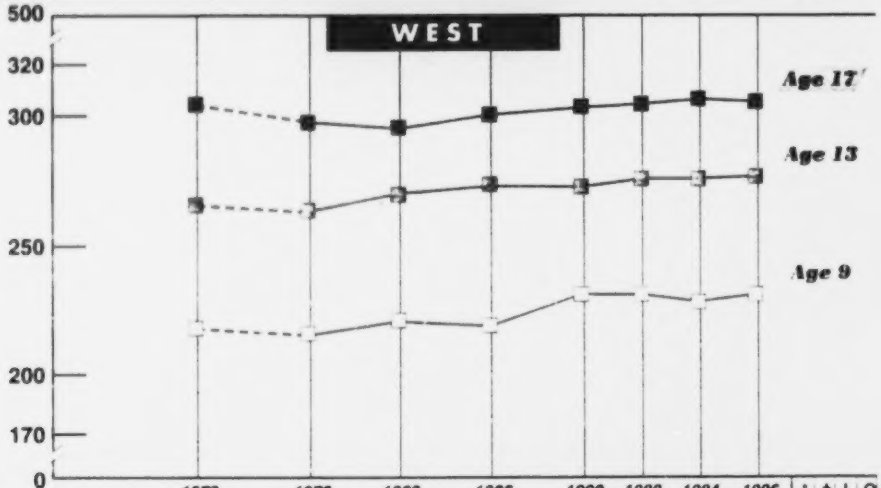
Figure 3.7 (continued)

Trends in Average Mathematics Scale Scores by Region, 1973 to 1996



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	306(1.8) —	305(1.9) 31(2.1)	302(1.4) 30(4.3)	304(1.9) 28(2.2)	311(2.1) 26(0.9)	312(2.0) 25(1.0)	307(2.2) 26(1.1)	314(2.0) 25(0.9)	+	+	+	+
Age 13	271(1.8) —	269(1.8) 31(1.8)	273(2.1) 27(3.4)	266(4.5) 25(5.0)	272(2.4) 24(0.7)	275(1.5) 27(1.0)	275(3.4) 27(1.8)	280(1.3) 23(1.0)	+		+	+
Age 9	224(1.5) —	224(1.5) 31(1.8)	221(2.7) 28(3.8)	226(2.3) 29(4.0)	231(1.3) 24(0.6)	234(1.6) 28(0.8)	233(1.8) 26(1.0)	233(2.3) 25(0.9)	+		+	+



	1973	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	303(2.0) —	296(1.8) 23(2.5)	294(1.9) 26(2.8)	299(2.7) 26(0.9)	302(1.5) 28(0.9)	303(1.5) 29(0.9)	305(2.4) 27(1.0)	304(2.3) 30(2.3)			+	+
Age 13	262(1.9) —	260(1.9) 24(2.2)	266(2.4) 27(2.3)	270(2.1) 28(1.5)	269(1.6) 29(0.9)	272(1.4) 29(0.9)	272(1.7) 31(1.1)	273(1.9) 30(1.9)	+		+	
Age 9	216(2.2) —	214(1.3) 23(2.0)	219(1.8) 27(2.0)	217(2.4) 28(1.6)	229(1.8) 28(0.8)	229(2.3) 27(0.8)	226(1.6) 28(1.0)	229(1.3) 30(2.6)	+		+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

[- - -] Extrapolated from previous NAEP analyses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (-) than that in 1973.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (-) than that in 1994.

L Indicates that the positive (+) or negative (-) linear trend is significant.

Q Indicates that the positive (+) or negative (-) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Mathematics Scale Scores by Parents' Highest Level of Education from 1978 to 1996

A consistent predictor of student achievement is the education level of the parents.[20] Presented in Figure 3.8 are trend results from 1978 to 1996 in average mathematics scores by parents' highest level of education. (Note that results by parental education level are not available for extrapolated data.) For all three age groups, students reported higher levels of parental education in 1996 than in 1978. For example, higher percentages reported having at least one parent who had graduated from college. Also, a lower percentage reported that neither parent had graduated from high school, or that high school graduation was their parents' highest level of educational attainment. It should be noted that across the trend assessments, approximately one-third of 9-year-olds and one-tenth of 13-year-olds responded "I don't know" to the question about their parents' highest level of education. Furthermore, some research has revealed the potential for young children to provide inaccurate reports about such information.[21]

In 1996, specific comparisons of mathematics scores were made between groups of students with different levels of parental education. In general, higher average scores were found for students who reported higher levels of parental education. These results were consistent for all age groups with only two exceptions: among 9-year-olds, no significant score differences were found between students with parents whose highest education level was high school graduation and students whose parents did not graduate from high school, or between students with at least one parent who had graduated from college and students whose parents' highest education level was some education beyond high school.

Among 17-year-olds, the average scores of students at each of the four levels of parental education have shown no consistent pattern of increases or decreases across the assessment years. For all four groups of 17-year-olds, average scores in 1996 were not significantly different from average scores in 1978.

At age 13, students who reported that neither parent had graduated from high school demonstrated an overall pattern of increasing scores resulting in an average score in 1996 that was higher than the average in 1978. A pattern of overall improvement was also observed for 13-year-olds with at least one parent who had received some education after high school and for students who reported high school graduation as their parents' highest level of education. However, the 1996 average scores for these two groups of students was not significantly different from those in 1978. For 13-year-olds who reported college graduation as their parents' highest level of education, no overall trend in average mathematics scores was observed, and the average score in 1996 did not significantly differ from the 1978 average.

For 9-year-olds at all reported levels of parental education, a pattern of overall improvement was observed across the assessment years. At the lowest and highest parental education levels, this overall pattern resulted in a 1996 average score that was higher than that in 1978.

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[20] National Center for Education Statistics (1990). *A profile of the American eighth grader: NELS:88 student descriptive summary* (NCES 90-458). Washington, DC: U.S. Department of Education.

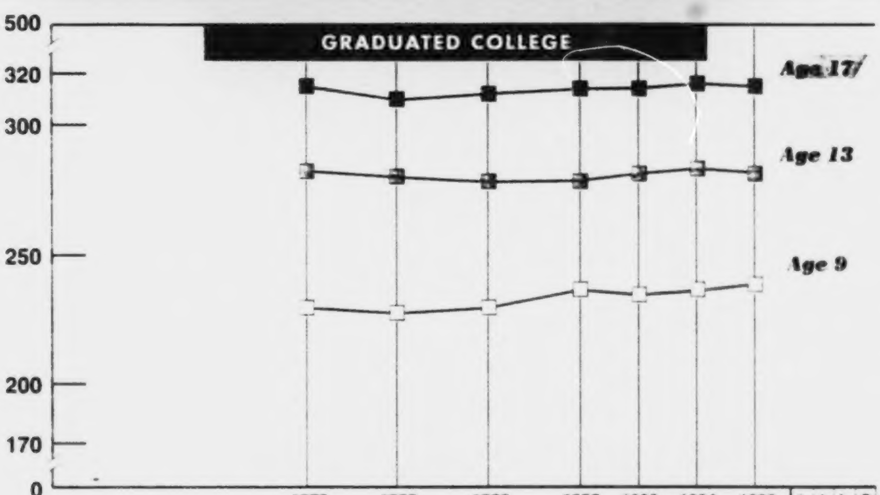
Reese, C. M., Miller, K. E., Mazzeo, J., & Dossey, J. A. (1997). *NAEP 1996 mathematics report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[21] Looker, E. D. (1989). Accuracy of proxy reports of parental status characteristics. *Sociology of Education, 62*(4), 257-276.

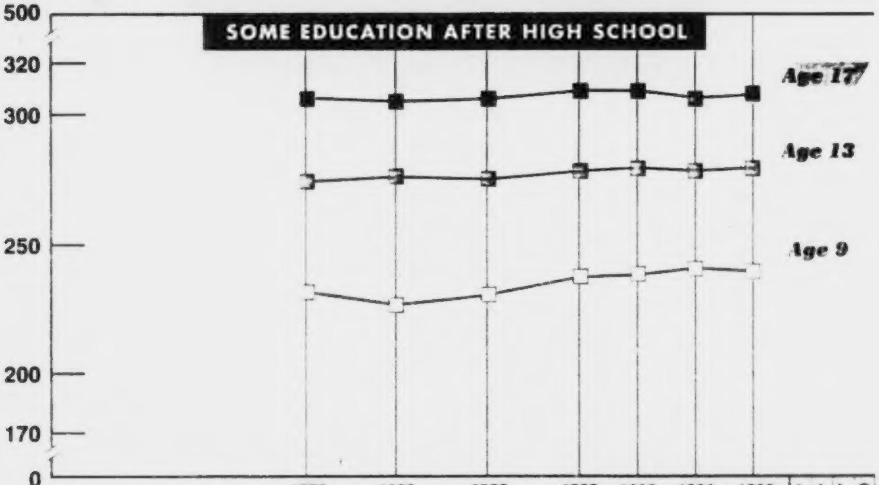
Figure 3.8

Trends in Average Mathematics Scale Scores by Parents' Highest Level of Education, 1978 to 1996

THE NATION'S REPORT CARD naep



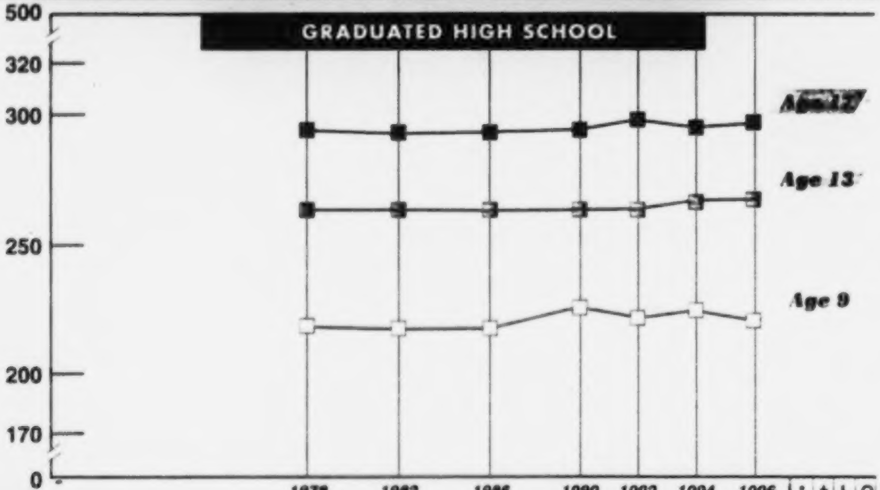
	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	317(1.0) 32(1.1)	312(1.0) 32(1.3)	314(1.4) 37(1.2)	316(1.3) 39(1.4)	316(1.0) 43(1.4)	318(1.4) 44(1.5)	317(1.3) 46(1.5)				
Age 13	284(1.2) 26(1.2)	282(1.5) 32(1.3)	280(1.4) 38(2.0)	280(1.0) 41(1.2)	283(1.0) 44(1.3)	285(1.2) 46(1.3)	283(1.2) 45(1.6)				
Age 9	231(1.1) 24(1.1)	229(1.5) 30(1.5)	231(1.1) 38(1.1)	238(1.3) 40(1.1)	236(1.0) 42(1.2)	238(0.8) 45(0.8)	240(1.4) 43(1.2)	+		+	



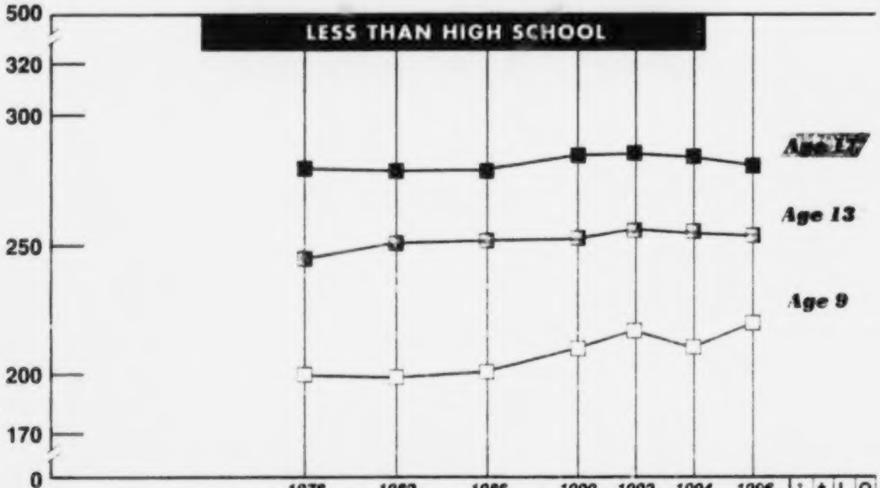
	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	305(0.9) 16(0.4)	304(0.9) 18(0.5)	305(1.2) 24(1.0)	308(1.0) 24(0.9)	308(1.1) 25(0.9)	305(1.3) 24(1.1)	307(1.5) 24(1.1)				
Age 13	273(1.2) 14(0.4)	275(0.9) 14(0.4)	274(0.8) 16(0.6)	277(1.0) 17(0.6)	278(1.0) 18(0.7)	277(1.6) 17(0.6)	278(1.4) 17(0.5)			+	
Age 9	230(1.7) 9(0.4)	225(2.1) 9(0.4)	229(2.1) 7(0.6)	236(2.0) 7(0.4)	237(1.9) 8(0.4)	239(2.1) 7(0.4)	238(2.5) 7(0.4)			+	

Figure 3.8 (continued)

Trends in Average Mathematics Scale Scores by Parents' Highest Level of Education, 1978 to 1996



	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	294(0.8) 33(0.7)	293(0.8) 33(0.8)	293(1.0) 28(1.1)	294(0.9) 26(1.1)	298(1.7) 21(0.9)	295(1.1) 22(0.8)	297(2.4) 21(1.1)				
Age 13	263(1.0) 33(0.8)	263(0.8) 34(0.8)	263(1.2) 31(1.3)	263(1.2) 27(0.8)	263(1.2) 23(0.9)	266(1.1) 23(0.9)	267(1.1) 23(1.0)			+	
Age 9	219(1.1) 23(0.8)	218(1.1) 25(0.8)	218(1.6) 16(0.7)	226(1.2) 16(0.7)	222(1.5) 14(0.7)	225(1.3) 14(0.6)	221(1.7) 13(0.6)			+	



	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	280(1.2) 13(0.6)	279(1.0) 14(0.9)	279(2.3) 8(0.4)	285(2.2) 8(0.6)	286(2.3) 8(0.6)	284(2.4) 7(0.5)	281(2.4) 6(0.7)				
Age 13	245(1.2) 12(0.6)	251(1.4) 11(0.6)	252(2.3) 8(1.1)	253(1.8) 8(0.5)	256(1.0) 6(0.5)	255(2.1) 6(0.4)	254(2.4) 6(0.4)	+		+	
Age 9	200(1.5) 8(0.4)	199(1.7) 8(0.7)	201(2.5) 4(0.4)	210(2.3) 5(0.4)	217(2.2) 4(0.3)	210(3.0) 4(0.4)	220(3.3) 4(0.5)	+		+	

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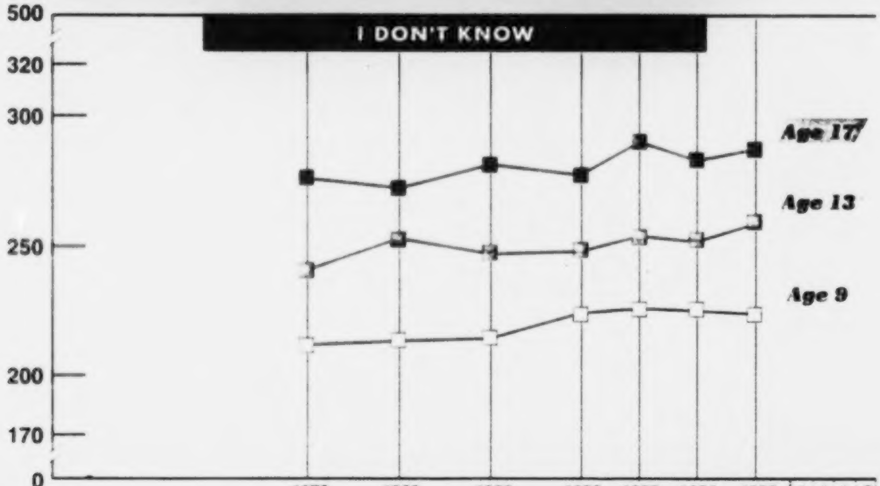
Figure 3.8 (continued)

Trends in Average Mathematics Scale Scores by Parents' Highest Level of Education, 1978 to 1996



	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
Age 17	276(1.9) 5(0.4)	272(1.8) 4(0.3)	281(2.4) 3(0.3)	277(2.8) 3(0.4)	290(3.9) 3(0.3)	283(3.8) 3(0.3)	287(4.0) 2(0.2)			+	
Age 13	240(1.3) 15(0.9)	252(3.2) 9(0.8)	247(2.3) 8(0.4)	248(2.1) 8(0.5)	253(1.8) 8(0.4)	252(2.4) 8(0.5)	259(1.4) 10(0.6)	+		+	
Age 9	211(1.1) 37(1.5)	213(1.5) 27(1.1)	214(1.4) 35(1.0)	223(1.0) 32(0.8)	225(1.0) 33(0.8)	225(1.1) 30(0.8)	223(1.0) 33(0.9)	+		+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Mathematics Scale Scores by Type of School from 1978 to 1996

In recent years, there has been considerable interest in comparing the educational quality of public and nonpublic schools. The public vs. private school debate was fueled about a decade ago by a major report concluding that private school students had higher mathematics and verbal achievement than their public school peers.[22] Previous large-scale assessments including NAEP have found higher mathematics achievement among students attending nonpublic schools compared to those in public schools.[23] The NAEP trend assessment results permit a comparison between the performance of students attending public and nonpublic schools. (Results by type of school are not available for extrapolated data.) However, inferences about the relative effectiveness of public and nonpublic schools should not be solely based on NAEP results. Average performance differences between the two types of schools may be related to socioeconomic and sociological factors such as per-pupil expenditures, academic curricula, course-taking patterns, disciplinary climate, and the level of parental involvement in students' education.[24] Some research has shown that the mathematics achievement of public and nonpublic school students may be statistically equivalent when factors such as school climate, parental support, and course work are held constant.[25]

Figure 3.9 presents trend data on the percentages of students attending public and nonpublic schools and their corresponding mathematics scale scores. The percentages of students enrolled in the two types of schools have remained relatively stable over time. In 1996, the approximate percentages of 9-, 13-, and 17-year-olds attending public schools were 87, 89, and 91 percent, respectively. In 1996, 9- and 13-year-olds attending nonpublic schools had higher average scores than their public school peers. Although the observed scores were in the same direction for 17-year-olds, the difference was not statistically significant.

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[22] Coleman, J. S., Hoffer, T., & Kilgore, S. (1982). *High school achievement: Public, Catholic, and private schools compared.* Basic Books.

National Center for Education Statistics (1995). *National education longitudinal study of 1988: Base year student survey.* Washington, DC.

[23] Campbell, J. R., Reese, C. M., O'Sullivan, C., & Dossey, J. A. (1996). *NAEP 1994 trends in academic progress.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

[24] Alexander, K. L., & Pallas, A. M. (1983). Private schools and public policy: New evidence on cognitive achievement in public and private schools. *Sociology of Education, 56,* 170-182.

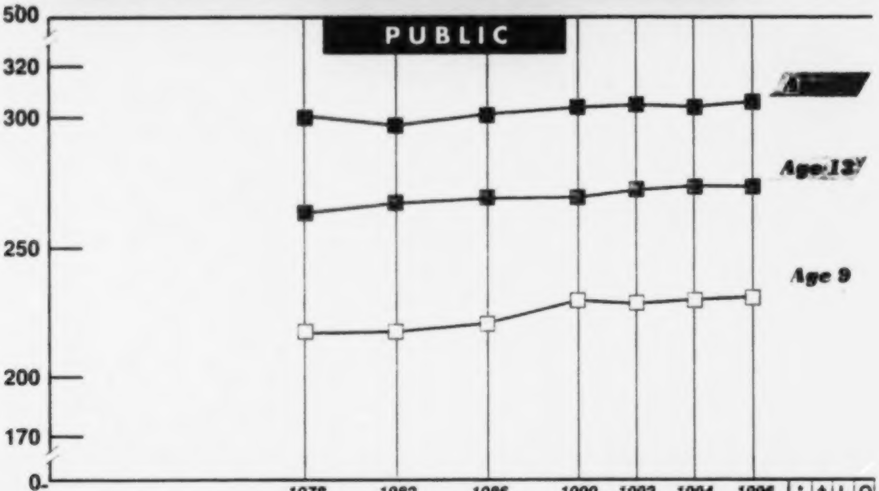
Berliner, D., & Biddle, B. (1996). In defense of schools. *Vocational Education Journal, 71*(3), 36-38.

[25] Mullis, I.V.S., Jenkins, F., & Johnson, E. G. (1994). *Effective schools in mathematics: Perspectives from the NAEP 1992 assessment.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

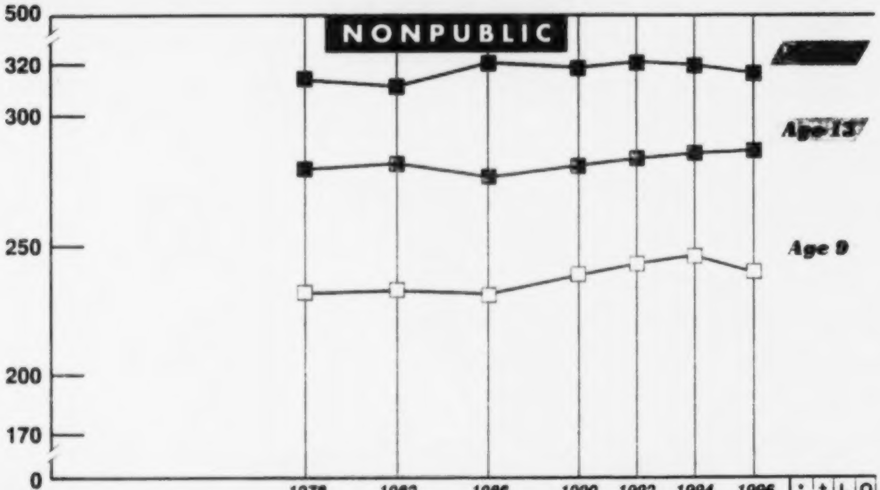
Public School Students. The average mathematics scores of public school students at all three ages indicated an overall pattern of increased performance from 1978 to 1996. For each age group, the positive linear trend resulted in an average score in 1996 that was higher than the average in 1978.

Nonpublic School Students. Despite some fluctuations, no significant trend across the assessment years was observed for 17-year-old nonpublic school students. There was no significant difference between the 1978 and 1996 average scores for this group of students. Thirteen-year-olds attending nonpublic schools exhibited an overall pattern of improved performance. However, the 1996 average score for these students was not significantly different than the 1978 average. Among nonpublic school students, the performance of 9-year-olds improved across the assessment years and resulted in an average score in 1996 that was higher than the average score in 1978.

Figure 3.9 Trends in Average Mathematics Scale Scores by Type of School, 1978 to 1996



	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
[illegible]	300(1.0) 94(1.0)	297(0.9) 92(1.6)	301(1.0) 96(1.4)	304(0.8) 93(1.8)	305(0.9) 91(2.2)	304(0.9) 88(2.3)	306(1.1) 91(1.7)	+		+	
Age 13	263(1.2) 91(1.6)	267(1.3) 89(1.3)	269(1.2) 96(1.8)	269(1.0) 90(1.4)	272(1.0) 88(1.9)	273(1.1) 88(1.7)	273(0.9) 89(1.8)	+		+	
Age 9	217(0.8) 89(1.8)	217(1.1) 87(2.2)	220(1.2) 84(2.7)	229(0.9) 89(2.1)	228(0.9) 87(1.6)	229(0.9) 88(1.8)	230(0.8) 87(1.5)	+		+	



	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
[illegible]	314(3.2) 6(1.0)	311(1.7) 8(1.6)	320(9.8) 4(1.4)	318(6.6) 7(1.8)	320(3.0) 9(2.2)	319(4.0) 12(2.3)	316(4.5) 9(1.7)				
Age 13	279(1.4) 9(1.6)	281(2.1) 11(1.3)	276(4.9) 4(1.8)	280(1.7) 10(1.4)	283(2.5) 12(1.9)	285(2.4) 12(1.7)	286(3.6) 11(1.8)			+	
Age 9	231(1.7) 11(1.8)	232(2.1) 14(2.2)	230(2.5) 16(2.7)	238(2.3) 11(2.1)	242(1.7) 13(1.6)	245(2.3) 12(1.8)	239(2.1) 13(1.5)	+		+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Summary

- The overall picture of mathematics achievement provided by the long-term trend results is one of early stability or declines followed by a pattern of increased performance. For 9-year-olds, scores remained stable from 1973 to 1982, but have increased since that time. The average score in 1996 was higher than that in 1973. For 13-year-olds, a pattern of improvement across the years resulted in a 1996 score that was higher than in 1973. For 17-year-olds, the increased performance observed after a period of decline from 1973 to 1982 has resulted in an average score in 1996 that did not differ significantly from that in 1973.

- The percentage of 9-year-olds students attaining at least Levels 150, 200, 250, and 300 on the mathematics scale in 1996 was higher than in 1978. Increased percentages were observed for 13-year-olds at or above Levels 200 and 250. At age 17, there were increases between 1978 and 1996 in the percentages of students who performed at or above Levels 250 and 300.

- Although there were slight variations, 9-, 13-, and 17-year-olds in the upper, middle two and lower quartiles of the performance distribution demonstrated an overall pattern of increasing scores across the assessment years. For each age group in each quartile, these gains resulted in average scores in 1996 that were higher than those in 1978.

- For White students aged 9 and 13, average scores increased overall across the assessment years resulting in 1996 averages that were higher than those in 1973. Although an overall gain was indicated by the trend analysis of White 17-year-olds' average scores, the average in 1996 was not significantly different from that in 1973. For Black students at all three ages, significant gains have been made in mathematics across the assessment years, and average scores in 1996 were higher than in 1973. Despite some fluctuations, Hispanic students in each age group demonstrated overall gains and attained average scores in 1996 that were higher than those of their counterparts in 1973.

- In 1996, White students outperformed their Black and Hispanic peers at each grade level. At age 9, the gap between White and Black students' mathematics performance decreased across the assessment years, and in 1996, it was lower than it had been in 1973. At ages 13 and 17, the performance gap between White and Black students decreased during the 1970s and most of the 1980s. Since that time, there is evidence that the gap has widened; however, the difference in 1996 was of a smaller magnitude than that in 1973. The gap between White and Hispanic 9-year-olds has remained relatively stable across the assessment years. At ages 13 and 17, there has been a general narrowing of the gap between White and Hispanic students' average scores across the assessments. Although the gap for 13-year-olds appears to have widened somewhat in recent assessments, the differences between White and Hispanic students' performance at ages 13 and 17 were smaller in 1996 than in 1973.

- Both male and female students aged 9 and 13 showed overall gains across the eight assessments, resulting in 1996 average scores that were higher than the 1973 averages. After a period of declining performance from 1973 to 1982, the averages scores of male and female 17-year-olds increased moderately. Although the overall pattern for these students was one of increased performance, there was no significant difference between the 1996 and 1973 average scores.

- In 1996, male students outperformed their female peers in each age group. At ages 9 and 13, trend analyses revealed a small, but significant shift across time: although female students tended to have higher average scores than their male peers in earlier assessment years, it has reversed in more recent years, so that male students now perform higher. At age 17, where male students have attained higher average scores than their female peers in each of the eight assessments, the pattern is one of narrowing gender gaps across the assessment years. However, the magnitude of the gap in 1996 was not significantly different from that in 1973.
- In the Northeast, a period of relatively stable performance for 9-year-olds during the 1970s and 1980s was followed by a period of increasing scores, resulting in a 1996 average score that was higher than the 1973 average. Although the average score of 13-year-olds in the Northeast increased between 1992 and 1994, a decrease between 1994 and 1996 has returned the average score for these students to a level not significantly different from that in 1973. Among 17-year-olds in the Northeast, average scores have recovered during the 1990s, after declining in the 1970s and remaining relatively stable in 1980s. However, the 1996 average score for these students did not differ significantly from that in 1973. In the Southeast, overall improvement was observed for 9-, 13-, and 17-year-olds across the assessment years, resulting in 1996 average scores that were higher than those in 1973. In the Central region, students at all three ages displayed gains since the 1980s, resulting in an overall pattern of improved performance and average scores in 1996 that were higher than those in 1973. In the West, both 9- and 13-year-olds demonstrated overall improvement and attained average scores in 1996 that were higher than those of their counterparts in 1973. Although 17-year-olds in the West have also shown overall improvement, the 1996 average score was not significantly different than the 1973 average.
- At age 9, students in the Northeast had higher average scores than their peers in the Southeast and the West. At ages 13 and 17, students in the Central region outperformed their peers in the Southeast and West.
- For all three age groups, higher percentages of students in 1996 than in 1978 reported that at least one parent had graduated from college. Nine-year-old students at each level of parental education displayed a pattern of overall improvement. However, the 1996 average score was higher than the 1978 average only for 9-year-olds who reported that at least one parent had graduated from college, or that neither parent had completed high school. An overall improvement was also indicated by the trend analyses of average scores for 13-year-old students at each level of parental education except the highest. However, the 1996 average score was significantly higher than the 1978 average only for 13-year-olds who reported that neither parent had completed high school. No overall trend or significant difference between assessment years was apparent in the average scores of 17-year-old students at any level of parental education.
- In 1996, the average scores of 9- and 13-year-old students attending nonpublic schools was higher than that of their peers attending public schools. The difference between 17-year-old public and nonpublic school students' average scores was not significantly different. Among

public school students, the average scores of 9-, 13-, and 17-year-old students displayed overall gains across the assessment years, resulting in 1996 average scores that were higher than the 1978 averages. Among nonpublic school students, the performance of 9-year-olds improved across the assessment years and resulted in an average score in 1996 that was higher than the average score in 1978. Although overall improvement was also indicated by the average scores of 13-year-old students attending nonpublic schools, there was no significant difference between the 1996 and 1978 average scores. Despite some fluctuations, there were no significant changes in the average scores of 17-year-olds attending nonpublic schools.

Chapter 4

Students' Experiences in Mathematics

With professional mathematics groups as well as federal legislation setting national goals for school mathematics, the focus on school mathematics in the United States has perhaps never been greater. Recommendations for reform include curriculum revision, more active learning and problem solving by students, encouragement of all students to reach their full potential through course selection and completion, and increased use of technology (calculators and computers) in the learning of mathematics.[26] Central to these new goals for school mathematics is the increased focus on student mastery of processes: problem solving, reasoning, communication, and connecting mathematical ideas across contexts. Calls for such a focus have come both from the mathematics community and from those who seek to employ the graduates of the nations' schools.[27]

This chapter examines relationships between average mathematics scores and self-reported student experiences in mathematics class such as classroom activities, course taking, and attitudes about mathematics. Results from the 1996 trend assessment are compared with results from the first assessment in which information on that experience was collected.

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[26] National Council of Teachers of Mathematics (1989). *Curriculum and evaluation standards for school mathematics.* Reston, VA.
National Council of Teachers of Mathematics (1991). *Professional standards for teaching school mathematics.* Reston, VA.

[27] Secretary's Commission on Achieving Necessary Skills (1992). *Learning a living: A blueprint for high performance.* Washington, DC: Department of Labor.
Committee on the Mathematical Education of Teachers (1991). *A call for change: Recommendations for the mathematical preparation of teachers of mathematics.* Washington, DC: Mathematical Association of America.

Mathematics Course Taking at Ages 13 and 17

Central to moving students to an internationally competitive level in mathematics is making sure that they have had an equal opportunity to learn the same mathematics content as their competitors. Studies across the time span of the NAEP trend assessment have indicated that U.S. students have not had such opportunities as a whole.[28] Others claim that even where U.S. schools provide equal opportunity for mathematics exposure, neither the focus of instruction nor the expectations for student performance match up with those found in the schoolrooms of our economic competitors.[29]

The NCTM teaching standards emphasize the need to extend both the amount of content that students learn and the number of courses that students take, as well as to change the way learning and teaching occur in school settings. This section examines the extent to which students are taking more advanced courses in the curriculum.

Table 4.1 presents trends in the types of mathematics classes taken by 13-year-olds over the last 10 years. Specific comparisons of 1996 and 1986 show that the percentage of students taking the regular mathematics curriculum has decreased, and the percentage taking pre-algebra classes has increased over that time period. Although the percentage has increased somewhat over the years, there was no significant difference between the proportion of students taking algebra in 1996 and in 1986. As would be expected, 13-year-olds pursuing higher levels of mathematics coursework in 1996 attained higher average mathematics scale scores. That is, 13-year-olds taking algebra had higher average scores than those taking pre-algebra, and students in pre-algebra outperformed their peers taking regular mathematics.

Table 4.1 Mathematics Course Taking at Age 13, 1986 and 1996

	ALGEBRA		PREALGEBRA		REGULAR MATH		OTHER	
Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
1996	20 (1.0)	295 (1.4)	36 (2.0) *	277 (1.0)	39 (2.3) *	263 (1.2)	5 (0.6)	275 (5.2)
1986	16 (2.0)	299 (1.6)	19 (1.8)	280 (1.2)	61 (3.0)	261 (0.9)	5 (0.5)	262 (3.8)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1986.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[28] McKnight, C. C., Crosswhite, F. J., Dossey, J. A., Kifer, E., Swafford, J. O., Travers, K. J., & Cooney, T. J. (1987). *The underachieving curriculum.* Champaign, IL: Stipes.

Westbury, I., Ethington, C. A., Sosniak, L. A., & Baker, D. P. (Eds.). (1994). *In search of more effective mathematics education.* Norwood, NJ: Ablex Publishing.

[29] Stevenson, H. W. & Stigler, J. W. (1992). *The learning gap. Why our students are failing and what we can learn from Japanese and Chinese education* (New York, NY: Summit Books, 1992).

Peak, L. (1996). *Pursuing excellence: A study of U.S. eighth-grade mathematics and science teaching, learning, curriculum, and achievement in international context. Initial findings from the Third International Mathematics and Science Study.* Office of Educational Research and Improvement. Washington, DC: U.S. Government Printing Office.

Mathematics course taking is compulsory for 13-year-olds but not always for 17-year-old students. Table 4.2 presents trends in the mathematics course-taking profile of 17-year-old students for the nation and by gender. The results in the table represent the students' highest level mathematics course taken to date. Since most 17-year-olds are in eleventh or twelfth grade, one would expect that, if they were enrolled in a typical curriculum with no interruptions in their pursuit of mathematics courses, they would be enrolled in algebra II or higher. Results for the nation show that in 1996, about 63 percent of the students met this expectation. Greater percentages of students in 1996 than in 1978 had taken advanced algebra and calculus courses, while lower percentages reported that their highest level course was first-year algebra or less. The percentage of 17-year-olds for which geometry was the highest course taken has remained relatively stable across the assessments. On the whole, these changes indicate that more students are electing or being required to take higher level courses than their counterparts in 1978. These results are similar to those from other studies documenting a trend toward more advanced course work among high school seniors.[30]

Table 4.2 Highest Level of Mathematics Course Taken at Age 17, for the Nation and by Gender, 1978 and 1996

		TOTAL		MALE		FEMALE	
	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Prealgebra or General Mathematics	1996	8 (0.6) *	269 (1.9)	9 (0.8) *	272 (2.5)	7 (0.8) *	265 (2.2)
	1978	20 (1.0)	267 (0.8)	21 (1.0)	269 (1.0)	20 (1.1)	265 (0.9)
Algebra I	1996	12 (1.0) *	283 (1.3)	14 (1.1)	287 (1.5)	11 (1.5) *	278 (2.2)
	1978	17 (0.6)	286 (0.7)	15 (0.6)	289 (0.9)	18 (0.7)	284 (1.0)
Geometry	1996	16 (1.0)	298 (1.3) *	17 (1.4)	302 (1.7) *	15 (1.0)	294 (1.5) *
	1978	16 (0.6)	307 (0.7)	15 (0.5)	310 (1.0)	18 (0.8)	304 (0.8)
Algebra II	1996	50 (1.6) *	316 (1.3) *	47 (2.1) *	320 (1.7)	53 (1.7) *	313 (1.4)
	1978	37 (1.2)	321 (0.7)	38 (1.2)	325 (0.8)	37 (1.3)	318 (0.9)
Precalculus or Calculus	1996	13 (1.1) *	339 (1.7)	13 (1.1) *	342 (2.3)	13 (1.3) *	335 (2.2)
	1978	6 (0.4)	334 (1.4)	7 (0.5)	337 (2.0)	4 (0.4)	329 (1.8)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1978.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[30] Blank, R. K. & Gruebel, D. (1995). *State indicators of science and mathematics education 1995: State-by-state trends and new indications from the 1993-94 school year.* Washington, DC: Council of Chief State School Officers.

In general, average mathematics scale scores for students at various levels of course taking have either declined or remained the same since 1978. Average mathematics scores in 1996 for 17-year-olds at the level of pre-algebra or first-year algebra were not significantly different from those in 1978. Among 17-year-olds whose highest level mathematics course was geometry or second-year algebra, the 1996 average score was below that in 1978. No significant difference between average scores in 1978 and 1996 was observed for students taking calculus.

An examination of the results by gender group indicates that the trend toward more advanced course work among 17-year-olds is evident for males and females. There were sharp declines for both groups in the percentages of students whose highest level of mathematics study was pre-algebra. A decline was also evidenced in the percentage of females whose highest level was algebra I. Conversely, for both gender groups, there was an increase from 1978 to 1996 in the percentages of students reaching algebra II and calculus. For both gender groups, the percentages whose highest level of mathematics study was geometry did not change significantly across the time period. The average scores in 1996 for both males and females at the geometry level were below those in 1978.

In 1996, males and females were compared with respect to the percentages at each level of mathematics course taking and the average scores at each level. A greater percentage of females than males reported that algebra II was their highest level of mathematics. None of the other percentage differences was significant. At the algebra I, geometry, algebra II, and calculus levels of course taking, males had higher average mathematics scores than did females. This result is consistent with the overall gender difference in mathematics scale scores evident among 17-year-olds.

Table 4.3 presents results on the highest level of mathematics course taken by racial/ethnic subgroups. In general, the trend toward more advanced course taking is evident among all three groups, albeit to varying degrees. Results on course taking for White students are similar to results found for the nation as a whole. That is, increases between 1978 and 1996 were observed in the percentages of White students reaching algebra II and calculus, as well as decreases in those whose highest level course was algebra I or less. Among Black and Hispanic 17-year-olds, the percentage that reported pre-algebra as their most advanced level also decreased from 1978 to 1996. The percentages at the algebra I level in 1978 and in 1996, however, did not significantly differ. As was found for White students, greater percentages of Black and Hispanic students reached algebra II in 1996 than in 1978. For Black students, there was also an increase in the percentage of students with geometry as their highest level of mathematics. Unlike White students, however, the proportion of Black and Hispanic students reaching calculus did not change significantly between 1978 and 1996.

Despite some increases in advanced course work, Black and Hispanic 17-year-olds were still less likely than their White peers in 1996 to be enrolled in the more challenging courses. Among 17-year-olds in 1996, a higher percentage of Hispanic than White students ended their mathematics course work at the pre-algebra level, and the percentage of students with algebra I as their highest level of mathematics was higher for Black than for White students. The percentage of White students whose highest course was algebra II was higher than that for Hispanic students, and a greater percentage of White than Black students had taken calculus.

In 1996, the percentages of Black 17-year-olds at the pre-algebra and calculus levels, and the percentage of Hispanic 17-year-olds at all levels except algebra II, were insufficient to statistically establish scale scores. However, where sample sizes were sufficient to make comparisons, White students outperformed their Black and Hispanic peers.

Combined, the results in Tables 4.1, 4.2, and 4.3 reflect a general upward movement in course taking as students face more challenging work, from the regular mathematics courses for 13-year-olds through the pre-calculus or calculus levels for 17-year-olds. These results for the nation at age 17 are generally consistent for gender groups and to varying degrees for specific racial/ethnic subgroups.

Table 4.3 Highest Level of Mathematics Course Taken at Age 17, by Race/Ethnicity, 1978 and 1996

		WHITE		BLACK		HISPANIC	
	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Prealgebra or General Mathematics	1996	7 (0.7) *	273 (2.3)	9 (1.5) *	*** (***)	14 (2.5) *	*** (***)
	1978	18 (1.1)	272 (0.6)	31 (1.3)	247 (1.6)	36 (3.1)	256 (2.3)
Algebra I	1996	11 (1.2) *	287 (2.0)	18 (2.0)	273 (2.4)	16 (2.2)	*** (***)
	1978	17 (0.6)	291 (0.6)	19 (1.2)	264 (1.5)	19 (2.1)	273 (2.8)
Geometry	1996	15 (1.2)	304 (1.6) *	16 (1.4) *	280 (3.0)	19 (2.3)	*** (***)
	1978	17 (0.7)	310 (0.6)	11 (0.8)	281 (1.9)	12 (1.2)	294 (4.4)
Algebra II	1996	53 (1.6) *	320 (1.4)	45 (3.6) *	299 (2.2)	41 (3.6) *	306 (2.8)
	1978	39 (1.3)	325 (0.6)	28 (2.1)	292 (1.4)	23 (2.5)	303 (2.9)
Precalculus or Calculus	1996	13 (1.4) *	342 (1.9)	8 (1.3)	*** (***)	9 (2.3)	*** (***)
	1978	6 (0.4)	338 (1.1)	4 (0.6)	297 (6.5)	3 (0.9)	*** (***)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1978.

*** Sample size insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Classroom Instruction at Age 17

The NAEP trend assessment results provide an opportunity to study changes in curricular and instructional programs that affect the nation's 17-year-olds. Trend data have been collected since 1978 on students' classroom activities that may be related to learning mathematics. Some activities reflect active engagement in mathematics learning, such as participating in class discussions, completing reports or carrying out projects, and using the board to work on problems. Other activities are more passive, such as listening to the teacher explain a lesson and watching the teacher work problems on the board. Table 4.4 presents data on the frequency of these classroom activities and average scale scores for 1978 and 1996.

Table 4.4 Mathematics Classroom Activities at Age 17, 1978 and 1996

In your high school mathematics courses, how often did you. . .	Year	OFTEN: Percent of Students	OFTEN: Average Scale Score	SOMETIMES: Percent of Students	SOMETIMES: Average Scale Score	NEVER: Percent of Students	NEVER: Average Scale Score
Listen to a teacher explain a mathematics lesson?	1996	86(0.6) *	310(1.5) *	11(0.8) *	301(3.5)	3(0.4)	287(5.5)
	1978	79(1.2)	304(1.5)	19(1.1)	294(3.2)	2(0.4)	***(***)
Discuss mathematics in class?	1996	62(1.8) *	311(1.6)	29(1.7) *	305(1.9) *	9(0.8)	298(2.9)
	1978	51(1.5)	306(1.8)	43(1.4)	298(1.8)	7(0.6)	289(4.0)
Watch the teacher work mathematics problems on the board?	1996	87(0.7) *	310(1.5) *	11(0.7) *	300(3.6)	3(0.4)	***(***)
	1978	80(1.1)	304(1.5)	18(0.9)	292(2.9)	2(0.4)	282(5.2)
Work mathematics problems on the board?	1996	27(1.4)	308(2.4)	49(1.5) *	311(1.6) *	24(1.1) *	302(1.7)
	1978	28(1.3)	303(1.9)	60(1.2)	302(1.8)	12(1.1)	293(3.9)
Make reports or do projects on mathematics?	1996	5(0.6) *	299(3.3)	35(1.4) *	312(1.6) *	60(1.6) *	307(1.8)
	1978	2(0.2)	***(***)	23(1.2)	300(2.5)	75(1.3)	302(1.5)
Take mathematics tests?	1996	84(1.0) *	310(1.6)	15(0.9) *	302(2.9) *	2(0.3)	***(***)
	1978	64(1.3)	308(1.7)	33(1.1)	292(2.1)	3(0.5)	270(4.7)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1978.

*** Sample size insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

In 1996, 86 percent of 17-year-olds reported that they "Often" listened to the teacher explain a mathematics lesson, and 87 percent "Often" watch the teacher work problems on the board. Both of these responses represent increases over those in 1978. A corresponding decrease from 1978 to 1996 was evidenced in the percentages of students who responded "Sometimes" to these items. These results indicate an increase in passive student activities since 1978. Such shifts in classroom activity are not consistent with the recommendations of the NCTM teaching standards.

On the other hand, student responses about "Often" discussing mathematics in class showed an increase from 1978 to 1996, paralleling a decrease in the "Sometimes" responses. The increase in classroom discussion indicates a movement toward meeting the present recommendations for teaching mathematics. Students in 1996 were also more likely than those in 1978 to report that they "Often" or "Sometimes" prepared reports or did projects on mathematics (and less likely to report that they "Never" did so). These results provide further evidence of a change in practice that corresponds to the suggested teaching approaches for getting students involved in creating or doing mathematics. In contrast to these changes, a higher percentage of students in 1996 than in 1978 reported that they "Never" worked mathematics problems on the board.

Seventeen-year-olds were also asked how often they take mathematics tests in class. About 84 percent of the students responded that they "Often" take mathematics tests, reflecting a considerable increase since 1978. A decrease was also observed for the "Sometimes" category. Whether this shift is toward or against the recommendations for change depends on the types of tests associated with the increased frequency. If the tests were different forms of assessment, providing teachers with information to improve instruction or learning, then the movement would be a positive one. If the tests focused on short-term goals and on procedures, however, the movement would be contrary to current recommendations.

Use of Technology in Mathematics Classes at Ages 13 and 17

As part of the information collected on the learning context and students' opportunity to learn, 13- and 17-year-olds were asked questions about the availability and use of computers in mathematics instruction. As shown in Table 4.5, over half of the nation's 13-year-olds in 1996 had studied mathematics through computer instruction and had access to computers for learning mathematics. Nearly three-fourths of 13-year-olds reported that they used computers when solving mathematics problems. These percentages reflect substantial increases over the percentages reported in 1978. Among 17-year-olds, over half reported having access to computers to learn mathematics in 1996. About 42 percent had studied mathematics through computer instruction, and 70 percent had used a computer in solving mathematics problems. Consistent with the results for 13-year-olds, the percentages of 17-year-olds responding "Yes" to these items in 1996 were higher than those observed in 1978.

Students at age 17 were also asked whether they had taken a course in computer programming. The percentage of students who responded affirmatively to this item rose from 1978 (10 percent) to 1996 (26 percent).

Table 4.5 Availablity and Use of Computers at Ages 13 and 17, 1978 and 1996

THE NATION'S REPORT CARD naep

		PERCENTAGE OF STUDENTS REPORTING "YES"	
		AGE 13	AGE 17
Had access to computer to learn mathematics	1996	56 (1.8) *	57 (2.3) *
	1978	12 (1.8)	24 (2.7)
Studied mathematics through computer instruction	1996	54 (1.8) *	42 (2.1) *
	1978	14 (0.9)	12 (1.1)
Used a computer to solve mathematics problems	1996	74 (1.2) *	70 (2.2) *
	1978	56 (1.4)	46 (1.5)
Took a course in computer programming	1996	**Question not asked at age 13.**	26 (1.2) *
	1978		10 (0.9)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1978.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment

Attitudes Toward Mathematics at Ages 13 and 17

Students' attitudes toward mathematics, their ability to use it, and its usefulness in their world are key goals stated for the K-12 curriculum in the NCTM teaching standards. Students' beliefs about the nature of mathematics may be key to their decisions to pursue mathematics, participate in classroom activities designed to provide opportunities to learn, and persist in applying mathematics to solve problems. To explore their views about mathematics, students were given statements and were asked to indicate their degree of agreement or disagreement with each. Table 4.6 contains a summary of 13- and 17-year-old students' responses to these statements.

The first four statements dealt with students' experience with mathematics itself including general liking for and self-perceptions of ability in mathematics. Almost two-thirds of 13- and 17-year-olds in 1996 were either undecided or did not want to take more mathematics courses. For 13-year-olds, this represented an increase since 1978. In contrast, about 72 percent of 13- and 17-year-olds in 1996 reported that they were undecided or disagreed that they were taking mathematics only because they had to. These percentages were not significantly different from those reported in 1978.

For both 13- and 17-year-olds, the percentages of students who agreed that they are good in mathematics increased between 1978 and 1996, indicating more favorable perceptions of ability. No significant difference between the years was observed in the percentage of 17-year-olds who agreed with the statement, "I usually understand what we are talking about in mathematics."

The last two statements dealt with students' perceptions of mathematics as a discipline. The statement, "Mathematics helps a person think logically," was agreed to by nearly three-fourths of 13- and 17-year-olds, indicating a fairly consistent view across adolescents that mathematics provides a rational base for thinking through problems and situations. No significant change was observed between 1978 and 1996 in these percentages for either age group. The statement, "New discoveries are seldom made in mathematics," sampled students' views about the dynamic nature of the subject. About one-third of 17-year-olds agreed with this statement in 1996. This percentage was higher than in 1978, indicating that fewer students affirmed the dynamic nature of mathematics. Among 13-year-olds, about one-third also agreed with this statement in 1996, although this percentage was not significantly different from that in 1978.

Table 4.6 Attitudes Towards Mathematics at Ages 13 and 17, 1978 and 1996

			STRONGLY AGREE OR AGREE		UNDECIDED, DISAGREE, OR STRONGLY DISAGREE	
	Age	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
I would like to take more mathematics.	13	1996	39 (1.3) *	276 (2.3) *	61 (1.3) *	275 (1.6) *
		1978	50 (1.5)	263 (2.6)	51 (1.5)	268 (1.4)
	17	1996	37 (1.3)	309 (1.8)	63 (1.3)	305 (1.7) *
		1978	39 (1.7)	304 (2.0)	61 (1.7)	295 (1.7)
I am taking mathematics because I have to.	13	1996	28 (1.1)	270 (2.1) *	72 (1.1)	278 (1.7) *
		1978	29 (1.4)	256 (2.4)	71 (1.4)	270 (1.9)
	17	1996	28 (1.4)	300 (2.3) *	72 (1.4)	309 (1.1) *
		1978	27 (1.5)	287 (2.5)	73 (1.5)	302 (1.8)
I am good at mathematics.	13	1996	71 (1.6) *	279 (1.7) *	29 (1.6) *	267 (2.4) *
		1978	65 (1.3)	270 (2.0)	35 (1.3)	258 (1.9)
	17	1996	60 (1.3) *	312 (1.4)	40 (1.3) *	298 (2.1) *
		1978	54 (1.5)	307 (2.0)	46 (1.5)	289 (1.5)
I usually understand what we are talking about in mathematics.	13	1996	Question not asked at age 13.			
		1978				
	17	1996	71 (1.3)	308 (1.5)	29 (1.3)	302 (2.4) *
		1978	67 (1.1)	303 (1.8)	33 (1.1)	290 (2.1)
Mathematics helps a person think logically.	13	1996	71 (1.1)	277 (1.9) *	29 (1.1)	271 (2.1) *
		1978	74 (1.1)	268 (1.9)	26 (1.1)	261 (2.4)
	17	1996	74 (1.1)	308 (1.3) *	26 (1.1)	302 (2.8) *
		1978	77 (1.1)	301 (1.7)	23 (1.1)	289 (2.2)
New discoveries are seldom made in mathematics.	13	1996	34 (1.4)	273 (1.8) *	66 (1.4)	277 (1.9)
		1978	36 (1.5)	255 (2.2)	64 (1.5)	272 (1.5)
	17	1996	32 (1.4) *	301 (2.2) *	68 (1.4) *	309 (1.5) *
		1978	19 (1.2)	284 (3.2)	81 (1.2)	302 (1.5)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1978.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment

Television Watching at Ages 9, 13, and 17

Table 4.7 presents students' reports about the amount of time they spend watching television per day. For 9- and 13-year-olds, 1982 was the first year this question was asked. For 17-year-olds, the first year was 1978. Students were asked to select the number of hours they watched television, and the data were aggregated into three categories: 0-2 hours, 3-5 hours, and 6 or more hours. Since 1986, NAEP has also tracked students' responses to a question about whether their family has any rules about watching television, and these data are shown in Table 4.8.

Table 4.7 Television Watching at Ages 9 and 13, 1982 and 1996; and at Age 17, 1978 and 1996

		Number of Hours Watched Per Day					
		0-2 Hours		3-5 Hours		6 or More Hours	
	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
AGE 9	1996	47(1.1)	233(1.2) *	36(1.0) *	234(1.0) *	18(0.9) *	220(1.4) *
	1982	44(1.1)	218(1.4)	29(0.6)	227(1.1)	26(1.0)	215(1.2)
AGE 13	1996	39(1.2) *	281(1.4) *	48(0.9) *	273(0.9) *	13(0.6) *	258(1.5)
	1982	45(0.8)	273(1.2)	39(0.4)	269(1.1)	16(0.8)	256(1.8)
AGE 17	1996	54(1.2) *	314(1.2) *	39(1.1) *	302(1.5) *	7(0.5) *	285(2.8)
	1978	69(0.7)	305(1.0)	26(0.6)	296(1.1)	5(0.2)	279(2.1)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1978 or 1982.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Among 9-year-olds, students reported somewhat less television watching than their 1982 counterparts. The percentage of students who reported watching television 6 or more hours a day decreased between 1982 and 1996, and a greater proportion indicated that they watched 3 to 5 hours. There was no significant change from 1982 to 1996 in the percentage of students who reported watching 0 to 2 hours each day. Among 13-year-olds, there was a decrease in the percentage of students who reported 6 or more hours of television viewing per day, and an increase in the percentage who reported watching 3 to 5 hours a day. In addition, a smaller proportion of 13-year-olds in 1996 reported watching little or no television each day (0 to 2 hours) compared to their counterparts in 1982.

An increase in television viewing is evidenced among 17-year-olds. Between 1978 and 1996, a smaller percentage reported watching only 0 to 2 hours of television per day, and a larger percentage reported watching 3 or more hours.

Specific comparisons were made to study the relationship between amount of television watching and average mathematics scale scores in 1996. At ages 13 and 17, students who watched more hours of television had significantly lower mathematics scores than students who watched fewer or no hours. At age 9, students who reported watching 6 or more hours of television per day had lower average mathematics scores than their peers who reported less television watching. There was no significant difference between the average scores of 9-year-olds who reported watching 0 to 2 hours and those who reported watching 3 to 5 hours.

Students' degree of television watching might be influenced by whether there are parental rules for this. Among 9-year-olds, a greater percentage of students reported that their parent(s) had rules about television watching in 1996 than in 1986. In contrast, no significant change was observed among 13- or 17-year-olds over this time period. In 1996, 44 percent of 9-year-olds and 27 percent of 13-year-olds reported having family rules about television watching. Only 12 percent of age 17 students reported having these rules. In 1996, there was no significant relationship between students' reports about television rules and their average mathematics scale scores.

Table 4.8

Students' Reports About Family Rules for Television Watching, Ages 9, 13, and 17, 1986 and 1996

THE NATION'S REPORT CARD naep

		YES		NO	
	Year	**Percent of Students**	**Average Scale Score**	**Percent of Students**	**Average Scale Score**
AGE 9	1996	44 (1.1) *	232 (1.2) *	56 (1.1) *	230 (0.9) *
	1986	37 (0.7)	220 (1.0)	63 (0.7)	223 (1.2)
AGE 13	1996	27 (1.0)	275 (1.3) *	73 (1.0)	274 (0.9) *
	1986	27 (1.2)	270 (1.6)	74 (1.2)	269 (1.1)
AGE 17	1996	12 (0.6)	307 (2.2) *	88 (0.6)	307 (1.2) *
	1986	11 (0.6)	300 (2.4)	89 (0.6)	303 (0.8)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1986.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Mathematics Homework at Age 17

One aspect of current interest in mathematics reform is the amount of homework assigned. Age 17 students were asked how often, in general, they do mathematics homework. As shown in Table 4.9, 75 percent of students reported doing mathematics homework "Often" in 1996; this represented an increase since 1978. The percentage who reported doing homework "Sometimes" decreased from 35 percent to 20 percent during this time period. The proportion of students who reported "Never" doing mathematics homework was small (5 to 6 percent) and did not significantly change since 1978.

For each of the three homework groups, average mathematics scores in 1996 were not significantly different from those in 1978. Comparisons of average scores in 1996 showed that students who did the greatest amount of mathematics homework tended to have higher mathematics scores. In 1996, students who reported doing mathematics homework "Often" had higher average mathematics scale scores than their peers who reported spending less time on homework. In interpreting these results, it should be considered that students' reports on the frequency of doing homework is not an indication of the content, quality, or difficulty of the assigned homework.

Table 4.9

Frequency of Doing Mathematics Homework at Age 17, 1978 and 1996

THE NATION'S REPORT CARD

		OFTEN		SOMETIMES		NEVER	
	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
AGE 17	1996	75 (1.7) *	312 (1.6)	20 (1.3) *	299 (2.3)	5 (0.9)	293 (4.3)
	1978	59 (2.0)	309 (1.6)	35 (1.9)	291 (2.1)	6 (0.7)	284 (3.5)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1978.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Summary

- Between 1986 and 1996, the percentage of 13-year-olds taking the regular mathematics curriculum decreased and the percentage taking pre-algebra increased, but there was no significant difference in the percentages taking algebra. In 1996, higher mathematics scores were observed for 13-year-old students taking more advanced mathematics course work.
- In 1996, 63 percent of 17-year-olds had enrolled in algebra II or a higher level of course work in mathematics. In general, 17-year-olds were taking more advanced coursework in 1996 than in 1978. That is, greater percentages of students were taking algebra II and calculus as their highest courses, while smaller percentages reported that their highest level of mathematics study was algebra I or less.
- Between 1978 and 1996, no significant differences were observed in average mathematics scores among 17-year-olds who had taken course work no higher than pre-algebra or algebra. Age 17 students who had taken course work no higher than geometry and algebra II had a 1996 average score that was below that in 1978. Among 17-year-olds who had taken calculus, there was no significant difference between 1978 and 1996 in average scores.
- For both male and female 17-year-olds, greater percentages of students in 1996 than in 1978 reported that their highest level of mathematics course work was algebra II or calculus. Likewise, the percentage of males and females ending their mathematics studies at the pre-algebra or general mathematics level decreased during this time period, as did the percentage of females ending their studies with first-year algebra. The 1996 average score was below that in 1978 for both males and females whose highest course was geometry.
- The only difference between male and female course taking in 1996 was a greater percentage of females with algebra II as their highest level of mathematics coursework. In 1996, male 17-year-olds had higher average mathematics scores than females among those students who reported algebra I, geometry, algebra II, or calculus as their highest levels of coursework.
- Between 1978 and 1996, the percentage of 17-year-old White students who had taken algebra II or calculus as their highest course increased, and a decrease was observed in the percentage of students ending their mathematics studies with algebra I or less. During this same time period, the percentages of Black and Hispanic 17-year-olds ending their mathematics studies at the pre-algebra level decreased, and the percentages of these students who had taken algebra II as their highest course increased. Increases were also observed in the percentage of Black students taking geometry as their highest mathematics course work.
- In 1996, the percentage of White 17-year-olds whose highest course work was algebra II was higher than that for Hispanic students, and a greater percentage of White than Black students reached the calculus level. Compared to White students, a higher percentage of Hispanic and Black students ended their mathematics coursework with pre-algebra and algebra I, respectively. Although sample sizes were insufficient to make most comparisons, White students had higher average scores than Black students among those who reported algebra I and geometry as their highest course work. Also, White students outperformed both Black and Hispanic among those who reported that their highest course work was algebra II.

- Compared to 1978, higher percentages of 17-year-olds in 1996 reported discussing mathematics in class and doing reports and projects in mathematics. In contrast, greater percentages of 17-year-olds in 1996 than in 1978 reported passive participation in the classroom in the form of listening to the teacher explain lessons and watching the teacher work problems on the board. Also, a greater percentage of students reported never working mathematics problems on the board in 1996 than in 1978. About 84 percent of 17-year-olds reported that they often take mathematics tests, which was an increase over the percentage reported in 1978.
- Greater percentages of 13- and 17-year-olds reported having studied mathematics through computer instruction, used computers when solving mathematics problems, and had access to computers for learning mathematics in 1996 than in 1978. In 1996, a greater percentage of 17-year-olds took a course in computer programming than in 1978.
- The majority of 13- and 17-year-olds in 1996 were either undecided or did not want to take more mathematics courses. For 13-year-olds, this represented an increase over the percentage in 1978. For both 13- and 17-year-olds, greater percentages of students agreed that they were good in mathematics in 1996 than in 1978. About one-third of both 13- and 17-year-olds agreed with a statement reflecting the belief that mathematics is a static field; for 17-year-olds, this reflected an increase over the percentage reported in 1978.
- The percentages of 9- and 13-year-olds who reported watching 6 or more hours of television per day decreased between 1982 and 1996. For both groups, increases were observed during this time period in the percentages who watched 3 to 5 hours. Also, a smaller proportion of 13-year-olds reported watching 0 to 2 hours of television in 1996 than in 1982. Among 17-year-olds between 1978 and 1996, a smaller percentage reported watching 0 to 2 hours of television per day, and the percentage watching 3 or more hours a day increased. Among 9-year-olds, the percentage of students whose parents held rules about television watching increased between 1986 and 1996; no significant differences were observed for 13- or 17-year-olds over this time period.
- A greater percentage of 17-year-olds in 1996 than in 1978 reported that they often did mathematics homework and a smaller percentage reported doing mathematics homework sometimes. The percentage of students who reported never doing homework did not significantly change during this time period. Seventeen-year-olds who did homework more often had higher average mathematics scores than students who did homework less frequently or never.

Part III Reading

Introduction

During the last 25 years, many advances in reading theory have led to new developments in the teaching of reading. Increased emphasis on comprehension and use of a more diverse range of reading materials are among many examples of how reading instruction has changed during the last quarter of a century. More recently, reading education has received increased attention from policy makers and educational organizations. In 1996, standards for the teaching of language arts, including reading, were released by two prominent professional organizations: the International Reading Association and the National Council of Teachers of English.[1] In addition, two federal initiatives set forth in 1997 — The America Reads Challenge, a program to recruit and train a million reading tutors to work with elementary school children, and a proposed national test to measure individual fourth graders' reading achievement — highlight the nation's commitment to students' reading achievement.

In the context of these recent efforts to increase student achievement in reading, the NAEP long-term trend assessment in reading provides one measure of the progress that has been made during the last 25 years and, perhaps, establishes a basis for expectations of future progress. To monitor progress across time in the reading achievement of American students, NAEP has conducted nine national assessments of reading performance involving representative samples of 9-, 13-, and 17-year-old students. These assessments were conducted in the 1970-71, 1974-75, 1979-80, 1983-84, 1987-88, 1989-90, 1991-92, 1993-94, and 1995-96 school years. They will subsequently be referred to by the latter half of the school year in which they occurred: 1971, 1975, 1980, 1984, 1988, 1990, 1992, 1994, and 1996.

Over the past few decades, theoretical discussions and pedagogical approaches have evolved within the field of reading in response to a growing awareness of the complexities of reading comprehension. Reading teachers and parents are becoming increasingly concerned with students' development of higher-order cognitive processes and strategies that facilitate in-depth and critical understanding of reading materials. In addition, research has indicated that reading is not simply a unitary skill but rather is characterized by interactive and constructive processes that vary according to contexts and purposes for reading. Accordingly, many educators and researchers have called for a reading curriculum that includes a wide variety of text types and reading activities.

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[1] National Council of Teachers of English and International Reading Association (1996). *Standards for the English language arts.* Urbana, IL and Newark, DE.

Beyond the research and reform efforts in reading instruction, the development of lifelong literacy habits and abilities that are fostered through family and environmental support are of growing concern. More and more, educators and parents agree that students must not only develop the ability to comprehend what they read but also develop an orientation to literacy that leads to lifelong reading and learning. Meeting such goals has been the impetus behind recent efforts to establish stronger links between schools and homes, and to involve parents more directly in helping students to meet these educational goals.

These current issues provide a dynamic context for examining and interpreting the results of NAEP's reading trend assessments. Part III of this report is intended to serve as a resource for groups concerned with improving students' reading achievement — not only reading teachers and researchers, but also educators in other subjects, policy makers, school administrators, and parents. Together with information from other sources, the findings provide a basis for discussing the adequacy of students' current reading achievement, in light of factors that appear to be related to reading abilities. These discussions may then lead to further development of means for improving reading performance in the years ahead.

The NAEP Long-Term Trend Reading Assessment

The NAEP reading trend assessment incorporates a wide range of text materials, from simple narrative passages to complex articles on specialized topics.[2] The selections include stories, poems, essays, reports, and passages from textbooks of varying levels of difficulty, as well as sample train schedules, telephone bills, and advertisements. Students' comprehension is assessed with a variety of question types. Some multiple-choice questions require students to identify particular information presented in the text. Constructed-response questions require students to restructure and interpret what they have read and to present their responses in writing. In order to measure trends over time, the same sets of reading materials and questions are administered in each assessment.

Students participating in each assessment were asked to provide information on their demographic characteristics, instructional experiences, and reading behaviors. The relationships observed between reading performance and self-reported background information can help educators, reading researchers, and policy makers to identify and discuss central issues and concerns and can guide further inquiries.

In addition to the NAEP 1996 long-term trend reading assessment which has measured trends since 1971, a separate "main" NAEP reading assessment was conducted in 1992 and 1994 and is planned for re-administration in 1998. The main NAEP reading assessment is based on a more recent framework representing current thinking about reading development and assessment. Its content consists entirely of authentic reading materials which are longer than those in the long-term trend assessment and which represent materials typically available to students in and out of school. Also, the newer assessment includes a greater proportion of constructed-response questions, and it measures students' achievement in reading for three purposes: reading for literary experience, reading to gain information, and reading to perform a task. Students participating in the newly developed reading assessments (1992 and 1994) were selected by grade definitions (4, 8, and 12) and completed the assessment at a different time of year than did students participating in the long-term trend assessment. The 1994 results from the newer assessment were published in an earlier report, *NAEP 1994 Reading Report Card for the Nation and the States.*[3] Because of the many differences between the two reading assessments, the results are not directly comparable.

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[2] *Reading objectives, 1983-84.* Princeton, NJ: Educational Testing Service.

Analysis Procedures

NAEP uses analysis techniques based on item response theory (IRT) to estimate students' reading ability on a scale ranging from 0 to 500. The NAEP reading scale is useful in making comparisons across assessments for the three age groups and among subpopulations of students. (The Procedural Appendix contains more detailed information about analysis procedures and student subgroups.) To provide a basis for interpreting the results, this report describes what students attaining different performance levels on the scale are able to do. Based on the assessment results, five levels of reading performance were defined:

Level 150 – Simple, Discrete Reading Tasks;

Level 200 – Partially Developed Skills and Understanding;

Level 250 – Interrelate Ideas and Make Generalizations;

Level 300 – Understand Complicated Information; and

Level 350 – Learn from Specialized Reading Materials.

Essentially, students performing at Level 150 were able to carry out simple, discrete reading tasks. At Level 200, students demonstrated partial skills and basic understanding of what they read. Performance at Level 250 suggests the ability to search for specific information, interrelate ideas, and make generalizations. Students performing at Level 300 were able to find, understand, summarize, and explain relatively complicated information. Those performing at Level 350 showed some ability to synthesize and learn from specialized reading materials.

NAEP reports the performance of groups and subgroups of students, not individuals. The measures of achievement included in this report are the average performance of groups of students on the NAEP reading scale and the percentages of students attaining successive levels of performance on the scale. Because the average scale scores and percentages presented in this report are based on samples, they are necessarily estimates. Like all estimates based on surveys, they are subject to sampling as well as measurement error. To compute standard errors, NAEP uses a complex procedure that estimates the sampling error and other random error associated with observed assessment results.

The 1996 assessment was statistically compared to two previous assessments: the prior assessment in 1994, and the first assessment which provided sufficient data on the variables being tested (i.e., the base year). The purpose of year-to-year statistical tests was to determine whether the results in the 1996 assessment were different from the results of the previous assessment or whether any changes had taken place since the base year assessment. Tests of other year-to-year comparisons can be found in previous reports of NAEP long-term trend assessments.

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[3] Campbell, J. R., Donahue, P. L., Reese, C. M., & Phillips, G. W. (1996). *NAEP 1994 reading report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

In addition to comparisons between individual assessment years, a second test of significance was conducted to detect statistically significant linear and quadratic trends across assessments. (See the Procedural Appendix for a discussion of the procedure.) This type of analysis makes it possible to discuss statistically significant patterns that may be missed by year-to-year comparisons. For example, from assessment to assessment, students' average scale scores may consistently increase (or decrease) by a small amount. Although these small increases (or decreases) between years may not be statistically significant under pairwise multiple comparisons, the overall increasing (or decreasing) trend in average scores may be statistically significant and noteworthy. The purpose of trend tests is to determine whether the results of the series of assessments could be generally characterized by a line or a simple curve. A linear trend tests for cumulative change over the entire assessment period, such as an increase or decrease at a relatively constant rate. Simple curvilinear (i.e., quadratic) relationships represent more complex patterns. Two examples of such patterns include initial score declines over part of the time period followed by subsequent increases in more recent assessments, or a pattern of initial score increases over a time period followed by a period of relatively stable performance.

This Section

Each chapter in this section of the report provides a somewhat different perspective on trends in students' reading abilities. Chapter 5 describes changes in the average reading performance of 9-, 13-, and 17-year-olds across the nine reading trend assessments conducted by NAEP since 1971. Chapter 6 summarizes trends in students' responses to questions about their reading instruction and experiences, and investigates the relationships between these background factors and reading achievement.

In Chapter 5, the results of statistical tests conducted to determine significant differences between 1996 and the first assessment year, and between 1996 and 1994, are indicated in grids that appear next to or below the figures and tables. The results from tests comparing the base year and 1996 assessments are summarized in the column labeled with the asterisk symbol "*." Significant differences are denoted with a "+" or "-" sign indicating that the 1996 average score was either greater than or less than the base year score, respectively. Similarly, significant differences between 1994 and 1996 assessment results are denoted with a "+" or "-" sign under the column labeled with the dagger symbol "‡" indicating that the 1996 average score was either greater or smaller than the 1994 average, respectively. The results from the linear and quadratic trend tests are summarized in the columns labeled "L" and "Q," respectively. Within each column, significant positive trends are denoted by a "+" sign and significant negative trends are denoted with a "-" sign. In Chapter 6, where only the first and most recent assessment results are presented, significant differences between the base year and 1996 are indicated within the tables. All of the differences and trend patterns discussed in this report are statistically significant at the .05 level.

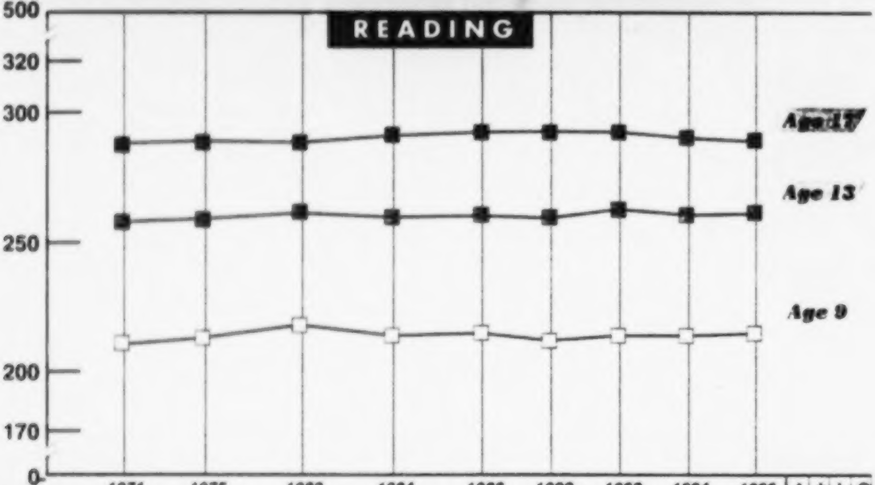
Chapter 5

Reading Scores for the Nation and Selected Subpopulations

Results for the Nation from 1971 to 1996

The results of the nine trend assessments in reading conducted from 1971 to 1996 are presented in Figure 5.1. This figure provides an indication of the trends in students' reading achievement over the past 25 years.

Figure 5.1 Trends in Average Reading Scale Scores for the Nation, 1971 to 1996



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	285(1.2)	286(0.8)	286(1.2)	289(0.6)	290(1.0)	290(1.1)	290(1.1)	288(1.3)	287(1.1)			+	–
Age 13	255(0.9)	256(0.8)	259(0.9)	257(0.5)	258(1.0)	257(0.8)	260(1.2)	258(0.9)	259(0.9)	+		+	
Age 9	208(1.0)	210(0.7)	215(1.0)	211(0.7)	212(1.1)	209(1.2)	211(0.9)	211(1.2)	212(1.0)	+			–

Standard errors of the estimated scale scores appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1971.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Seventeen-year-olds. Among 17-year-olds, a pattern of increases in performance was observed in assessments during the 1970s and 1980s. However, this pattern has not continued in recent assessments. Although the overall trend is one of moderate gains, the average score of students in 1996 did not differ significantly from that of their counterparts in 1971 or in 1994.

Thirteen-year-olds. Across the assessment years, 13-year-olds demonstrated an overall pattern of marginally increased performance. Although there was no significant change since 1994, the 1996 average score remained higher than the 1971 average.

Nine-year-olds. Although increases in the average scores of 9-year-olds were observed in the assessments from 1971 to 1980, scores did not continue to increase after that time. Little change has been observed during the last decade; however, the average score of 9-year-olds in 1996 was higher than that in 1971, but not significantly different from that in 1994.

National Trends in Levels of Reading Performance from 1971 to 1996

To provide more specific information about the types of reading abilities displayed by students, five levels of performance have been identified and described along the NAEP scale: 150, 200, 250, 300, and 350.[4] An empirical procedure, used to "anchor" performance at the five levels on the scale, delineated sets of questions likely to be answered successfully by students who performed at a particular level and much less likely to be answered successfully by students performing at the next lower level. The selected questions were then analyzed by reading experts in order to develop a detailed picture of the reading skills displayed by students at each of the five levels. The descriptions in Figure 5.2 characterize the reading abilities of most students at each of the five levels.

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[4] In theory, performance levels above 350 and below 150 could have been defined; however, so few students in the assessment performed at the extreme ends of the scale that it was not practical to do so.

Figure 5.2 Levels of Reading Performance

THE NATION'S REPORT CARD naep

Level 350:

Learn from Specialized Reading Materials

Readers at this level can extend and restructure the ideas presented in specialized and complex texts. Examples include scientific materials, literary essays, and historical documents. Readers are also able to understand the links between ideas, even when those links are not explicitly stated, and to make appropriate generalizations. Performance at this level suggests the ability to synthesize and learn from specialized reading materials.

Level 300:

Understand Complicated Information

Readers at this level can understand complicated literary and informational passages, including material about topics they study at school. They can also analyze and integrate less familiar material about topics they study at school as well as provide reactions to and explanations of the text as a whole. Performance at this level suggests the ability to find, understand, summarize, and explain relatively complicated information.

Level 250:

Interrelate Ideas and Make Generalizations

Readers at this level use intermediate skills and strategies to search for, locate, and organize the information they find in relatively lengthy passages and can recognize paraphrases of what they have read. They can also make inferences and reach generalizations about main ideas and author's purpose from passages dealing with literature, science, and social studies. Performance at this level suggests the ability to search for specific information, interrelate ideas, and make generalizations.

Level 200:

Partially Developed Skills and Understanding

Readers at this level can locate and identify facts from simple informational paragraphs, stories, and news articles. In addition, they can combine ideas and make inferences based on short, uncomplicated passages. Performance at this level suggests the ability to understand specific or sequentially related information.

Level 150:

Simple, Discrete Reading Tasks

Readers at this level can follow brief written directions. They can also select words, phrases, or sentences to describe a simple picture and can interpret simple written clues to identify a common object. Performance at this level suggests the ability to carry out simple, discrete reading tasks.

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Table 5.1 presents the percentages of students who performed at or above each reading performance level in the nine reading assessments conducted by NAEP since 1971. It is expected that older students will have more success with the increasingly difficult reading tasks reflected in the higher performance level descriptions. This was the case, as students showed a clear pattern of increased reading abilities from ages 9 to 17.[5] (Data on performance levels by gender, race/ethnicity, modal grade, region, parents education level, type of school, and quartiles can be found in the Data Appendix.)

Table 5.1

Trends in Percentage of Students At or Above Five Reading Performance Levels, 1971 to 1996

Performance Levels	Age	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
		Assessment Years												
Level 350 Learn from Specialized Reading Materials	9	0(***)	0(***)	0(***)	0(***)	0(***)	0(***)	0(***)	0(***)	0(***)				
	13	0(0.0)	0(0.0)	0(0.0)	0(0.1)	0(0.1)	0(0.1)	1(0.3)	1(0.1)	1(0.2)	+		+	
	17	7(0.4)	6(0.3)	5(0.4)	6(0.3)	5(0.6)	7(0.5)	7(0.6)	7(0.7)	6(0.8)				+
Level 300 Understand Complicated Information	9	1(0.1)	1(0.1)	1(0.1)	1(0.1)	1(0.3)	2(0.3)	1(0.2)	1(0.3)	1(0.3)				
	13	10(0.5)	10(0.5)	11(0.5)	11(0.4)	11(0.8)	11(0.6)	15(0.9)	14(0.8)	14(1.0)	+		+	
	17	39(1.0)	39(0.8)	38(1.1)	40(0.8)	41(1.5)	41(1.0)	43(1.1)	41(1.2)	39(1.4)			+	
Level 250 Interrelate Ideas and Make Generalizations	9	16(0.6)	15(0.6)	18(0.8)	17(0.6)	18(1.1)	18(1.0)	16(0.8)	17(1.2)	18(0.8)	+		+	
	13	58(1.1)	59(1.0)	61(1.1)	59(0.6)	59(1.3)	59(1.0)	62(1.4)	60(1.2)	61(1.3)	+		+	
	17	79(0.9)	80(0.7)	81(0.9)	83(0.5)	86(0.8)	84(1.0)	83(0.8)	81(1.0)	81(0.9)	+		+	–
Level 200 Partially Developed Skills and Understanding	9	59(1.0)	62(0.8)	68(1.0)	62(0.7)	63(1.3)	59(1.3)	62(1.1)	63(1.4)	64(1.2)	+			
	13	93(0.5)	93(0.4)	95(0.4)	94(0.3)	95(0.6)	94(0.6)	93(0.7)	92(0.6)	93(0.6)				–
	17	96(0.3)	96(0.3)	97(0.3)	98(0.1)	99(0.3)	98(0.3)	97(0.4)	97(0.5)	97(0.5)	+		+	–
Level 150 Simple, Discrete Reading Tasks	9	91(0.5)	93(0.4)	95(0.4)	92(0.3)	93(0.7)	90(0.9)	92(0.4)	92(0.7)	93(0.7)	+			–
	13	100(0.0)	100(0.1)	100(0.1)	100(0.0)	100(0.1)	100(0.1)	100(0.3)	99(0.2)	100(0.1)			–	–
	17	100(0.1)	100(0.1)	100(0.1)	100(0.0)	100(***)	100(***)	100(0.1)	100(0.1)	100(***)				

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1971.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[5] The performance levels are based upon a vertical scale that assumes reading ability is cumulative. Younger students are not expected to perform at the same level as older students. Therefore, most 9-year-olds are not expected to reach the upper levels of performance.

In theory, performance levels above 350 and below 150 could have been defined; however, so few students in the assessment performed at the extreme ends of the reading scale that it was not practical to do so.

Level 350. The percentage of students demonstrating the more advanced reading abilities outlined at Level 350, such as learning from specialized reading materials, continued to be quite small in 1996. For 17-year-olds, a decline in the percentage of students at this level during the 1970s has reversed, so that in 1996 the percentage was not significantly different from that in 1971.

Level 300. The percentage of 13-year-olds performing at or above Level 300 (understanding of complicated information) increased across the assessments and was higher in 1996 than in 1971. The overall pattern for 17-year-olds at this level was also one of moderately increased performance. However, in 1996 the percentage who performed at or above Level 300 was not significantly different from that in 1971.

Level 250. Interrelating ideas and making generalizations were characteristic of performance at Level 250. Although some decline since 1988 has been observed among 17-year-olds, the trend analyses at all three ages revealed an overall pattern of increased percentages of students performing at or above this level, resulting in 1996 percentages that were higher than those in 1971.

Level 200. In 1996, as in past assessments, nearly all of the 17-year-old students and the overwhelming majority of 13-year-old students performed at or above Level 200, demonstrating at least partially developed skills and understanding. At age 13, there was some indication that earlier gains in the percentages of students at this level have not continued since 1988. Although slightly less than two-thirds (64 percent) of 9-year-olds performed at or above Level 200, this was higher than in 1971.

Level 150. Across the assessment years, nearly all 13- and 17-year-old students and the overwhelming majority of 9-year-olds were successful with the simple, discrete reading tasks representative of this level. Although the gains that were made by 9-year-olds at this level until 1980 have not been sustained, the 1996 percentage of students at or above Level 150 was higher than that in 1971.

Trends in Reading Scale Scores by Quartile from 1971 to 1996

Figure 5.3 presents average reading scale scores for 9-, 13-, and 17-year-old students who were in the upper quartile (upper 25 percent), the middle two quartiles (middle 50 percent), and the lower quartile (lower 25 percent) of student performance in each assessment. These data reveal changes that have occurred in the last 25 years for students at different points along the performance distribution. An examination of these data can provide a picture of how students with lower or higher reading abilities have progressed across the assessment years. This information is particularly relevant in light of the objective of Goal 3 of The National Education Goals, which states that "the academic performance of elementary and secondary students will increase significantly in every quartile...."[6] The goal emphasizes that students of all abilities should be granted access to educational opportunities and should demonstrate gains in educational achievement. The long-term trend results presented in Figure 5.3 display varied patterns of change for students across the performance distribution at all three grades.

Seventeen-year-olds. For 17-year-old students in the upper quartile, the decrease that was observed between 1975 and 1980 has reversed, and the pattern over the entire period between 1971 and 1996 is one of slightly increasing performance. The average score of these students in 1996, however, did not differ significantly from that of their counterparts in 1971. Among students in the middle two quartiles, the overall pattern was one of increased performance until the most recent assessments. In 1996, the average score did not differ significantly from that in 1971. In the lower quartile, a pattern of growth was observed during the 1970s and 1980s. Although scores have declined since their highs in the late 1980s, the overall trend was positive, and the average in 1996 remained higher than the average in 1971.

Thirteen-year-olds. At age 13, early and more recent gains among students in the upper quartile have resulted in an overall pattern of increased performance and an average score in 1996 that was higher than that in 1971. At the middle two quartiles, an overall trend of increased performance has also been observed, and the 1996 average score was higher than the 1971 average score. For students in the lower quartile, gains that were observed in 1980 have not been maintained, so that the average in 1996 was not significantly different from that in 1971.

Nine-year-olds. Among 9-year-olds, students in the upper quartile demonstrated an overall pattern of increased performance since 1971. Although scores declined slightly after 1990, the average score of these students in 1996 remained higher than that of their counterparts in 1971. In the middle two and lower quartiles, early gains that were observed from 1971 to 1980 have not been maintained. Nonetheless, in 1996 the average scores of these middle and lower performing students were higher than those observed in 1971.

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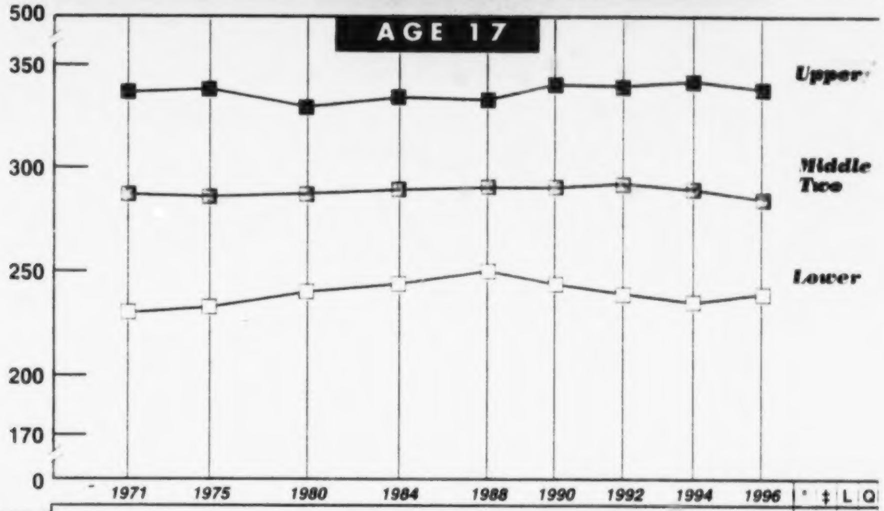
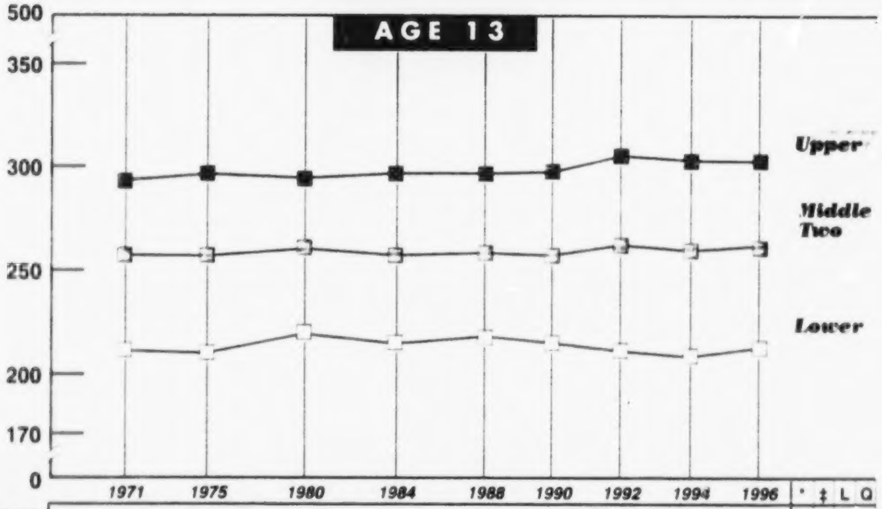
[6] National Education Goals Panel (1996). *The national education goals reports: Building a nation of learners.* Washington, DC: U.S. Government Printing Office.

Figure 5.3 Trends in Average Reading Scale Scores by Quartile, 1971 to 1996



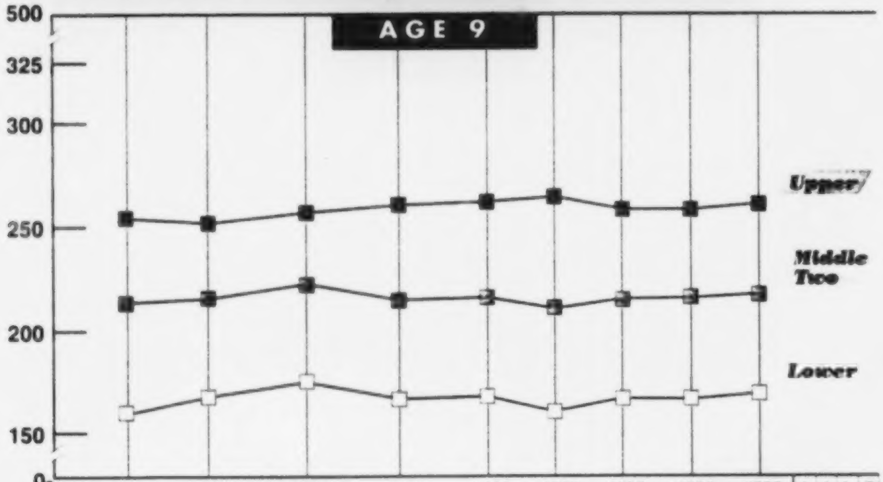
	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	333(0.6)	334(0.5)	327(0.8)	331(0.5)	330(1.3)	336(1.1)	335(0.9)	337(1.3)	334(1.2)			+	+
Middle Two	289(0.5)	288(0.4)	289(0.4)	291(0.3)	292(0.7)	292(0.5)	293(0.7)	291(0.7)	289(1.0)			+	–
Lower Quartile	230(0.8)	232(1.0)	238(1.0)	241(0.3)	246(1.1)	241(1.6)	237(1.3)	234(1.3)	237(1.1)	+		+	–



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	293(0.4)	296(0.4)	294(0.5)	296(0.5)	296(1.0)	297(0.8)	303(1.1)	301(0.8)	301(1.2)	+		+	+
Middle Two	258(0.4)	258(0.4)	261(0.3)	258(0.2)	259(0.7)	258(0.5)	262(0.6)	260(0.8)	261(0.7)	+		+	
Lower Quartile	212(0.7)	211(0.5)	219(0.7)	215(0.5)	217(1.0)	215(0.9)	212(1.4)	210(0.9)	213(1.4)				–

Figure 5.3
(continued)

Trends in Average Reading Scale Scores by Quartile, 1971 to 1996



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	253(0.5)	251(0.7)	255(0.8)	258(0.4)	259(1.6)	261(1.1)	256(0.9)	256(1.0)	258(0.9)	+		+	–
Middle Two	211(0.4)	213(0.3)	218(0.3)	212(0.3)	213(0.7)	209(0.6)	212(0.7)	213(0.7)	214(0.7)	+			–
Lower Quartile	157(0.7)	163(0.5)	169(1.0)	162(0.6)	163(1.6)	157(1.5)	162(1.0)	162(1.4)	164(1.8)	+			–

Standard errors of the estimated scale scores appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1971.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Reading Scale Scores by Race/Ethnicity from 1971 to 1996

Figure 5.4 shows trends in average reading scale scores for White, Black, and Hispanic students.[7] For White and Black students, results are reported from the first trend reading assessment in 1971. For Hispanic students, results are reported from 1975, the first year in which the sample allowed an accurate estimate of the scores for this population.

White Students. Although an overall pattern of improving performance was observed for 17-year-old White students, the average score for these students in 1996 was not significantly different from that of their counterparts in 1971. For both 9- and 13-year-old White students, the overall trend in reading scores was one of increased performance across the assessment years. In both age groups, the 1996 average score was higher than the 1971 average.

Black Students. In all age groups, Black students demonstrated a pattern of performance gains through the 1970s and 1980s followed by a period of decline in the early 1990s. However, the overall trend was positive, and the 1996 average score in each group remained higher than the 1971 average.

Hispanic Students. Among 17-year-old Hispanic students, the overall pattern was one of increased performance, but declining scores during the 1990s have resulted in a 1996 average that did not differ significantly from that of their counterparts in 1975. At age 13, the average scores of Hispanic students shown no pattern of increases or decreases, so that performance in 1996 did not differ significantly from that in 1975. The average scores of 9-year-old Hispanic students have fluctuated somewhat across the assessment years, but the 1996 average score was higher than the 1975 average.

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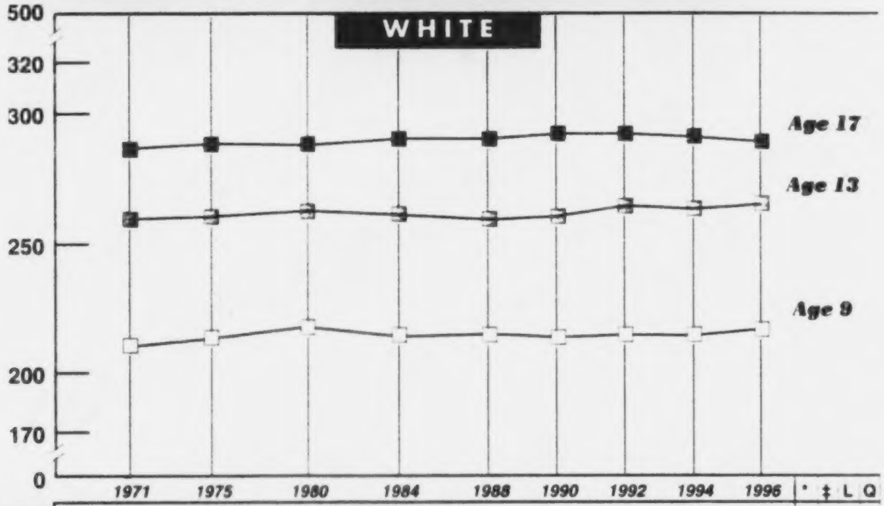
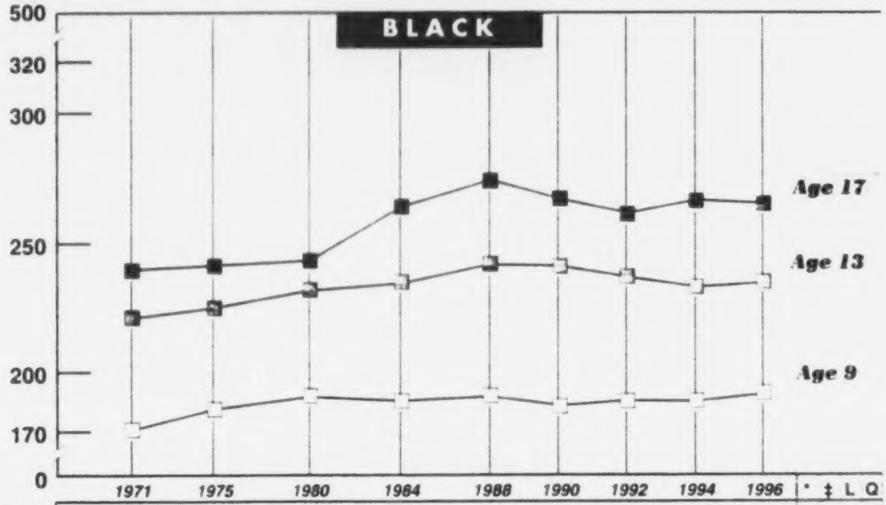
[7] For Asian/Pacific Islander students and American Indian students, the sample sizes were insufficient to permit reliable trend estimates.

Figure 5.4 Trends in Average Reading Scale Scores by Race/Ethnicity, 1971 to 1996



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	291(1.0) 87(1.3)	293(0.6) 84(1.0)	293(0.9) 83(1.6)	295(0.7) 77(0.6)	295(1.2) 77(0.6)	297(1.2) 74(0.5)	297(1.4) 75(0.6)	296(1.5) 72(0.8)	294(1.2) 72(0.7)			+	
Age 13	261(0.7) 84(1.4)	262(0.7) 81(1.2)	264(0.7) 80(1.8)	263(0.6) 77(0.6)	261(1.1) 76(0.7)	262(0.9) 74(0.8)	266(1.2) 73(0.7)	265(1.1) 74(0.5)	267(1.0) 71(0.7)	+		+	
Age 9	214(0.9) 84(1.4)	217(0.7) 80(1.2)	221(0.8) 79(1.3)	218(0.8) 75(1.2)	218(1.4) 75(1.0)	217(1.3) 74(1.0)	218(1.0) 74(0.9)	218(1.3) 75(0.7)	220(1.2) 71(0.9)	+		+	



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	239(1.7) 11(1.2)	241(2.0) 11(0.8)	243(1.8) 12(1.4)	264(1.0) 14(0.2)	274(2.4) 15(0.3)	267(2.3) 16(0.3)	261(2.1) 15(0.3)	266(3.9) 15(0.3)	265(2.7) 15(0.3)	+		+	–
Age 13	222(1.2) 15(1.4)	226(1.2) 13(0.9)	233(1.5) 14(1.3)	236(1.0) 14(0.2)	243(2.4) 15(0.3)	242(2.2) 15(0.2)	238(2.3) 16(0.4)	234(2.4) 15(0.5)	236(2.6) 15(0.6)	+		+	–
Age 9	170(1.7) 14(1.3)	181(1.2) 13(0.8)	189(1.8) 14(1.0)	186(1.1) 16(0.5)	189(2.4) 16(0.7)	182(2.9) 16(0.6)	185(2.2) 16(0.4)	185(2.3) 15(0.6)	190(2.7) 17(0.5)	+		+	–

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Figure 5.4
(continued)

Trends in Average Reading Scale Scores by Race/Ethnicity, 1971 to 1996

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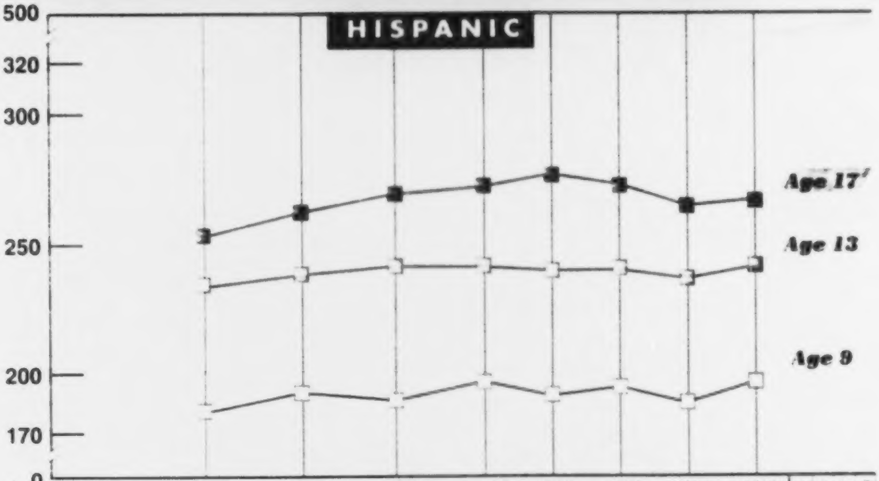

	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	252(3.6) 3(0.6)	261(2.7) 4(0.6)	268(2.2) 7(0.7)	271(4.3) 6(0.5)	275(3.6) 7(0.4)	271(3.7) 8(0.6)	263(4.9) 8(0.5)	265(4.1) 9(0.6)			+	–
Age 13	233(3.0) 5(0.8)	237(2.0) 6(1.0)	240(1.7) 7(0.7)	240(3.5) 6(0.6)	238(2.3) 8(0.5)	239(3.5) 7(0.4)	235(1.9) 8(0.4)	240(2.9) 9(0.6)				
Age 9	183(2.2) 5(0.8)	190(2.3) 6(0.8)	187(2.1) 7(1.4)	194(3.5) 6(1.0)	189(2.3) 6(0.6)	192(3.1) 7(0.8)	186(3.9) 6(0.4)	194(3.5) 8(1.0)	+			

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1971 (for White and Black students) or in 1975 (for Hispanic students).

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Reading Scale Scores by Gender from 1971 to 1996

Figure 5.5 presents trends in average reading scale scores for male and female students at all three ages.

Male Students. Among 17-year-old male students, increases were observed throughout the 1970s and 1980s. During the 1990s, however, scores declined, and no significant difference was observed between the 1996 and 1971 average scores. At age 13, the average scores of male students have not changed significantly across the assessment years. The performance of 9-year-old male students increased until 1980. Although these gains did not continue, the overall pattern was one of improved performance and the 1996 average score for 9-years-olds remained higher than that of their 1971 counterparts.

Female Students. At age 17, the overall pattern for female students was one of improved performance; however, their average score in 1996 did not differ significantly from that of their counterparts in 1971. For 13-year-old female students, average scores improved overall across the assessments years, so that performance in 1996 was higher than that in 1971. Although no overall trend pattern was observed for 9-year-old female students across the assessment years, the average score attained by these students in 1996 was higher than that of their counterparts in 1971.

Figure 5.5 Trends in Average Reading Scale Scores by Gender, 1971 to 1996

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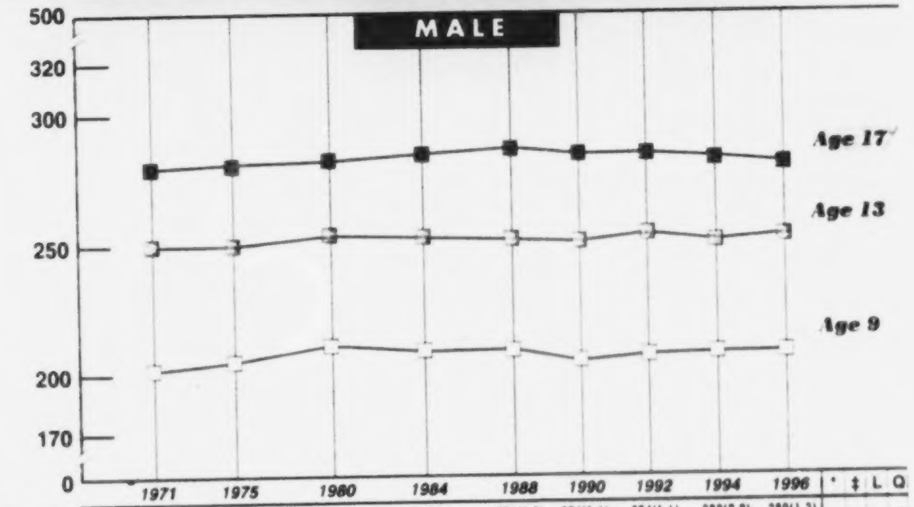
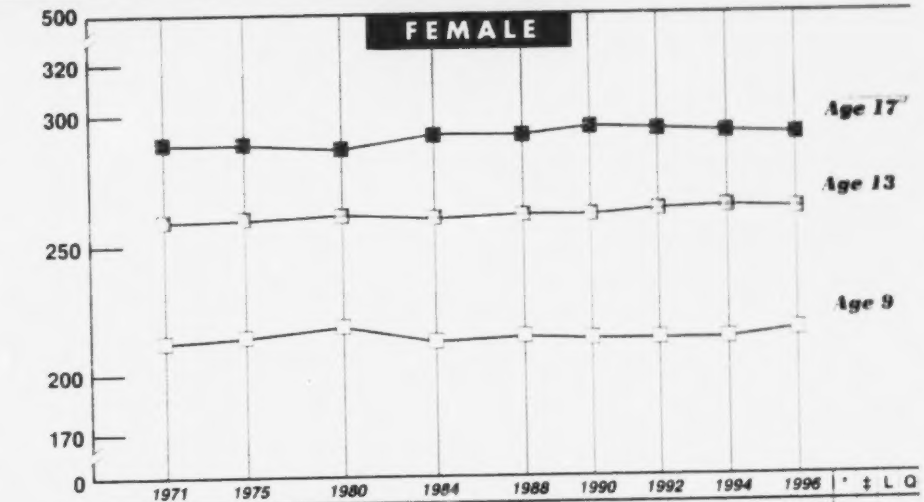


	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	279(1.2) 49(0.5)	280(1.0) 49(0.5)	282(1.3) 51(0.6)	284(0.6) 51(0.7)	286(1.5) 48(1.3)	284(1.6) 50(0.6)	284(1.6) 52(0.9)	282(2.2) 50(1.4)	280(1.3) 51(1.0)				–
Age 13	250(1.0) 50(0.4)	250(0.8) 50(0.5)	254(1.1) 49(0.3)	253(0.6) 51(0.5)	252(1.3) 50(0.8)	251(1.1) 50(0.9)	254(1.7) 49(0.9)	251(1.2) 51(0.8)	253(1.2) 49(0.9)				
Age 9	201(1.1) 50(0.4)	204(0.8) 50(0.4)	210(1.1) 50(0.4)	208(0.8) 50(0.5)	208(1.4) 50(0.8)	204(1.7) 51(0.9)	206(1.3) 51(0.7)	207(1.3) 50(0.8)	207(1.5) 49(0.9)	+		+	–



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	291(1.3) 51(0.5)	291(1.0) 51(0.5)	289(1.2) 50(0.6)	294(0.8) 49(0.7)	294(1.5) 52(1.4)	297(1.2) 50(0.6)	296(1.1) 48(0.9)	295(1.5) 50(1.4)	294(1.2) 49(1.0)			+	
Age 13	261(0.9) 50(0.4)	262(0.9) 50(0.5)	263(0.9) 51(0.3)	262(0.6) 49(0.5)	263(1.0) 51(0.8)	263(1.1) 50(0.9)	265(1.2) 51(0.9)	266(1.2) 49(0.8)	265(1.2) 51(0.9)	+		+	
Age 9	214(1.0) 50(0.4)	216(0.8) 50(0.4)	220(1.1) 50(0.4)	214(0.8) 50(0.5)	216(1.3) 50(0.8)	215(1.2) 49(0.9)	215(0.9) 49(0.7)	215(1.4) 50(0.8)	218(1.2) 51(0.9)	+			

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1971.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Differences in Average Reading Scale Scores by Race/Ethnicity and by Gender

The previous two sections presented trends in reading achievement for White, Black, and Hispanic students, and for male and female students. As with past NAEP assessments, significant performance differences between racial/ethnic subgroups and between males and females were observed in 1996. Academic performance differences between White and minority students have been the focus of numerous research studies and policy initiatives. Some studies have identified differential opportunities for learning and supportive environments as factors contributing to discrepancies in educational achievement.[8] For example, research suggests that the learning opportunities of minority students may be diminished by substandard school and curricular resources, or by fewer economic and home resources.[9]

These factors are consistent with other research that has used NAEP results to explore differences in performance between racial groups.[10] Recent arguments demonstrate that reporting unadjusted differences among racial groups may be misleading since these groups come from different family, school, and community contexts that are related to achievement. When achievement results are controlled for social context, test score differences between groups may be reduced.[11] Other research shows that while a substantial performance gap still exists, the performance difference between non-Hispanic White 13- and 17-year-olds and their Hispanic and Black peers has narrowed between 1975 and 1990. Gains among Black and Hispanic students, however, could not be explained by changing family characteristics (parental education level, family size, family income) alone.[12]

Gender differences in reading and writing achievement have also been examined. Research often points to differences in social influences and educational expectations to explain, in part, the higher average reading and writing scores attained by female students.[13] Figure 5.6 presents trends in differences between the average scale scores for selected subgroups of students across the assessment years.

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[8] Dulaney, C., & Bethune, G. (1995). *Racial and gender gaps in academic achievement: An updated look at 1993-94 data.* (Report Summary). Wake County Public Schools System, Raleigh, NC: Department of Evaluation and Research. (ERIC Document Reproduction Service No. ED 384 417)

Stevens, F. (1993). *Opportunity to learn: Issues of equity for poor and minority students.* Washington, DC: National Center for Education Statistics.

[9] Fine, M. (1991) *Framing dropouts.* Albany, NY: State University of New York Press.

MacIver, D. J., & Epstein, J. L. (1990). *How equal are opportunities for learning in disadvantaged and advantaged middle grade schools?* (Report No. 7). Center for Research on Effective Schooling for Disadvantaged Students. Baltimore, MD: Johns Hopkins University.

[10] Berends, M., & Koretz, D. M. (1995). Reporting minority students' test scores: How well can the National Assessment of Educational Progress account for differences in social context? *Educational Assessment, 3(3),* 249-285.

Jaynes, G. D., & Williams, R. M. Jr. (Eds.). (1989). *A common destiny: Blacks and American society.* Washington, DC: National Academy Press.

Grissmer, D. W., Kirby, S. N., Berends, M., & Williamson, S. (1994). *Student achievement and the changing American family.* Santa Monica, CA: Rand.

[11] Berends, M., & Koretz, D. M. op. cit.

[12] Grissmer, D. W., et. al., op. cit.

[13] Cummings, R. (1994). 11th graders view differences in reading and math. *Journal of Reading, 38*(3), 196-199.

Schick, R. (1992). *Social and linguistic sources of gender differences in writing composition.* Paper presented at the Annual meeting of the National Reading Conference, San Antonio, TX.

White-Black and White-Hispanic. An examination of performance in 1996 among the three ethnic groups showed that, at all ages, White students outperformed their Black and Hispanic peers. The gap between the average scores of White and Black students aged 13 and 17 narrowed between 1971 and 1988, going from a 53-point difference to a 20-point difference at age 17, and from 39 points to 18 points at age 13. This trend was the result of average scores for Black students increasing 36 points for 17-year-olds and 21 points for 13-year-olds. In comparison, the average scores for White students increased no more than 4 points at either age. Since 1988, however, there is evidence that the trend toward smaller gaps among 13- and 17-year-olds has reversed due to decreasing scores for Black students. In 1996, the average scores of 13- and 17-year-old Black students were lower than those of their counterparts in 1988, by 7 points at age 13 and by 9 points at age 17. Among their White peers, however, 13-year-olds have shown an increase of 6 points and 17-year-olds have shown a little change since 1988. Even with the recent widening of the gap, in 1996 the score difference between White and Black students at age 17 remained smaller than that in 1971. However, there was no significant difference between the 1996 and 1971 gaps for 13-year-olds. Among 9-year-olds, scale score gaps have generally decreased across the assessment years, resulting in a smaller gap in 1996 compared to that in 1971.

The gap between White and Hispanic students aged 9 and 13 was relatively consistent across the assessment years. At age 17, the magnitude of the gap decreased from 1975 to 1990 as the average score for Hispanic students increased 22 points, while the average for White students increased only 4 points. Due to a pattern of decreasing performance among Hispanic students since 1990, however, the gap between White and Hispanic 17-year-olds' average scores returned to a level in 1996 that did not differ significantly from that in 1975.

Male-Female. Consistent with other studies documenting differences in literacy development between males and females, the NAEP reading trend assessments revealed a continued disparity between the two groups, with female students outperforming male students.[14] Despite some fluctuations, the difference between the average scores of 9-year-old males and females has remained relatively consistent across the assessment years. At ages 13 and 17, there were indications that the gaps between males and females decreased slightly between 1971 and 1980, but have fluctuated or increased since that time, so that the gaps in 1996 were not significantly different from those in 1971.

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[14] Campbell, J. R., Donahue, P. L., Reese, C. M., & Phillips, G. W. (1996). *NAEP 1994 reading report card for the nation and the states.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Plewis, I. (1992, Summer). Pupils' progress in reading and mathematics during primary school: Associations with ethnic group and sex. *Educational Leadership, 33,* 133-140.

Figure 5.6

Trends in Differences in Average Reading Scale Scores by Race/Ethnicity and Gender

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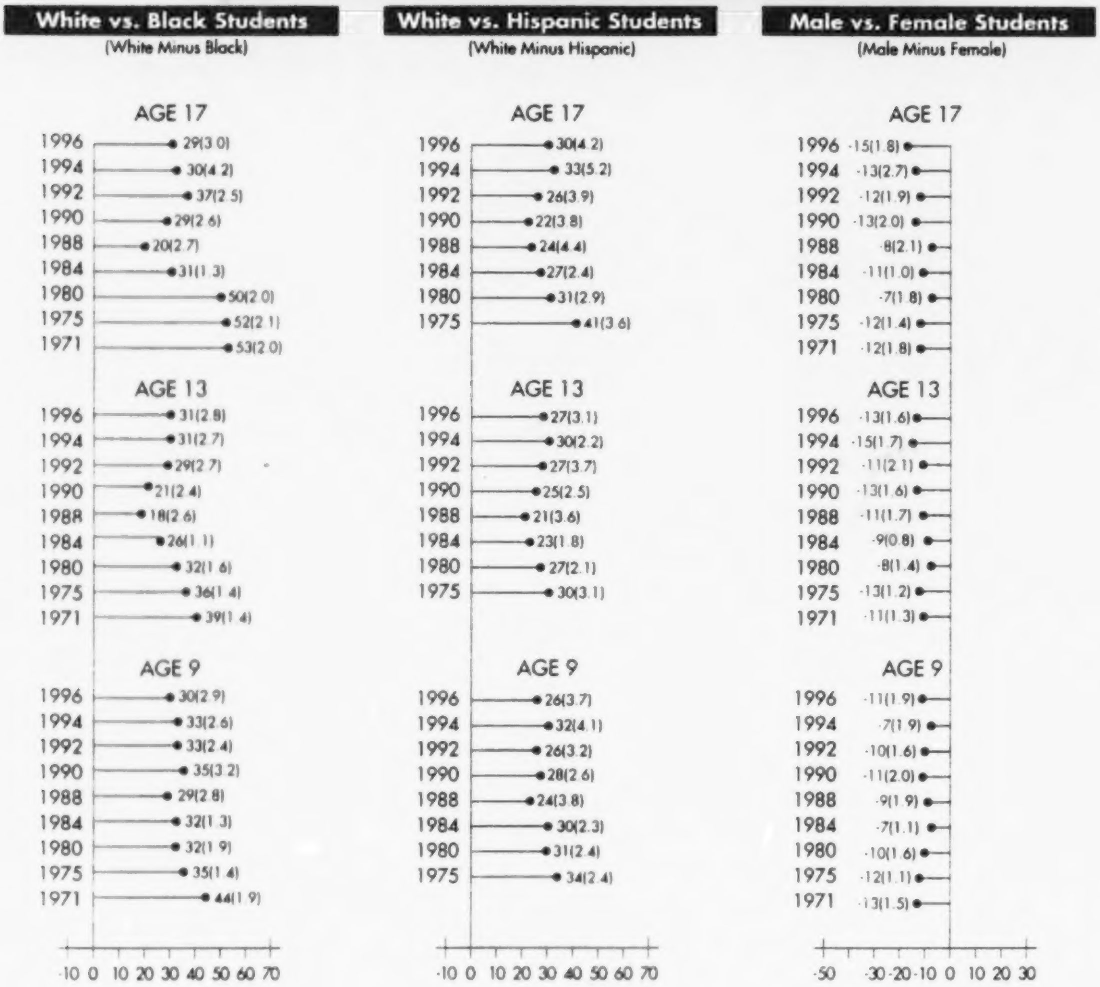


White vs. Black Students
(White Minus Black)

White vs. Hispanic Students
(White Minus Hispanic)

Male vs. Female Students
(Male Minus Female)

	*	‡	L	Q
Age 17	–		–	+
Age 13			–	+
Age 9	–		–	

	*	‡	L	Q
Age 17				+
Age 13				
Age 9				

	*	‡	L	Q
Age 17				–
Age 13				–
Age 9				

Standard errors of the estimated scale score differences appear in parentheses.

* Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1971 (for White vs. Black student and Male vs. Female student differences) or in 1975 (for White vs. Hispanic student differences).

‡ Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Reading Scale Scores by Region from 1971 to 1996

Figure 5.7 presents trends in average reading scale scores for students from the Northeast, Southeast, Central, and West regions of the country.

Northeast. For 13- and 17-year-old students, no overall trend was observed across the assessment years, and the 1996 average scores were not significantly different from the 1971 averages. Although an overall trend pattern was not apparent across the assessment years for 9-year-olds in the Northeast, the 1996 average score for this age group was higher than the 1971 average.

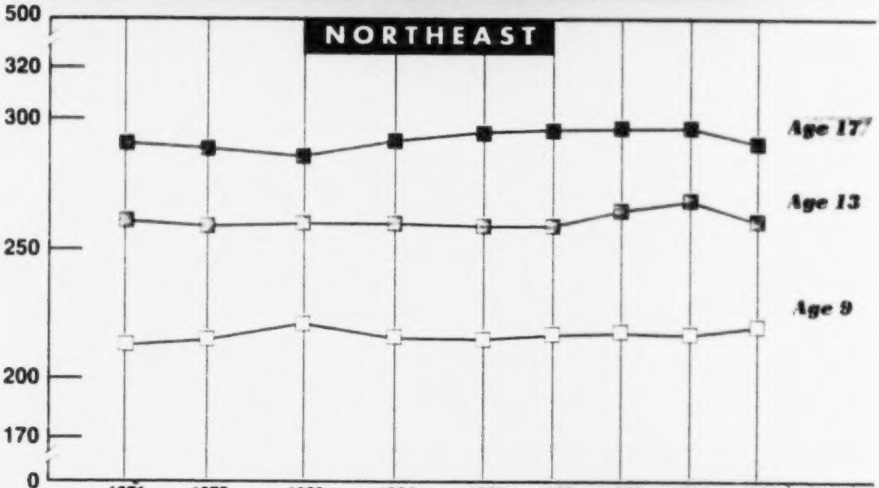
Southeast. The average scores of 13- and 17-year-olds displayed a pattern of improvement from 1971 to 1988 followed by a period of declining scores. Although the overall pattern remains one of increased performance, in 1996 the average score for both age groups returned to a level that did not differ significantly from that in 1971. For 9-year-olds in the Southeast, some fluctuation was observed in average scores since 1971. However, the 1996 average for this age group was higher than the 1971 average.

Central. For students in each age group in the Central region, no consistent pattern of increasing or decreasing scores was observed across the assessment years. However, 13-year-olds in 1996 attained an average score that was higher than that of their counterparts in 1971.

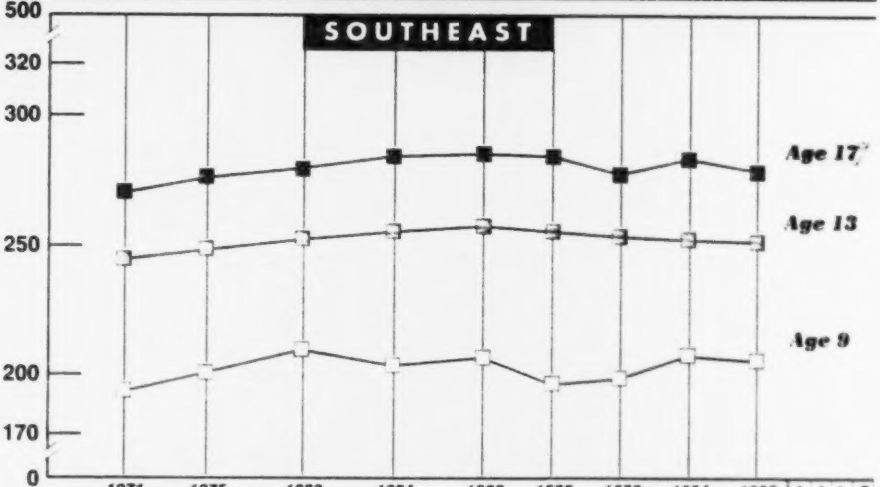
West. Despite slight fluctuations, the average scores of students in the West region have not changed significantly since the first assessment year. The 1996 average scores of students in each age group did not differ significantly from those observed in 1971.

In 1996, comparisons of average scale scores for each age group indicated several instances of significant differences between regions. At age 9, students in the Northeast outperformed their peers in the Southeast and West regions. Among 13-year-olds, students in the Central region had higher average scores in 1996 than did students in the Southeast and West regions. At age 17, students in the Northeast and the Central regions had higher average scores than students in the Southeast region.

Figure 5.7 Trends in Average Reading Scale Scores by Region, 1971 to 1996



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	291(2.8) 26(1.9)	289(1.7) 26(1.2)	286(2.4) 22(2.9)	292(1.9) 24(0.4)	295(2.9) 23(0.8)	296(1.8) 23(1.1)	297(3.2) 22(0.9)	297(4.2) 22(1.2)	291(2.8) 22(2.6)				
Age 13	261(2.0) 24(1.5)	259(1.8) 25(1.1)	260(1.8) 24(2.2)	260(0.6) 23(0.4)	259(2.4) 23(2.2)	259(1.8) 23(1.0)	265(3.2) 22(0.8)	269(2.0) 20(0.7)	261(2.5) 23(2.3)				
Age 9	213(1.7) 26(1.5)	215(1.3) 27(1.1)	221(2.1) 23(2.1)	216(1.7) 22(0.4)	215(2.6) 22(1.5)	217(2.2) 22(1.1)	218(2.6) 21(1.3)	217(2.9) 22(1.0)	220(1.9) 24(2.7)	+			



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	271(2.4) 20(1.8)	277(1.4) 20(0.8)	280(2.2) 21(1.9)	285(1.6) 22(1.8)	286(2.1) 23(1.0)	285(2.5) 23(0.9)	278(2.9) 25(1.4)	284(2.8) 25(1.7)	279(2.6) 24(2.9)			+	−
Age 13	245(1.7) 24(2.2)	249(1.5) 22(1.1)	253(1.6) 24(2.7)	256(1.5) 23(1.7)	258(2.2) 24(1.4)	256(2.2) 23(0.8)	254(2.5) 23(1.6)	253(2.5) 22(1.6)	252(3.2) 26(2.7)			+	−
Age 9	194(2.9) 22(1.7)	201(1.2) 22(0.8)	210(2.3) 24(2.3)	204(1.6) 24(1.2)	207(2.1) 25(1.7)	197(3.2) 24(1.2)	199(2.0) 23(1.4)	208(3.0) 24(1.5)	206(2.9) 24(2.4)	+			

Figure 5.7
(continued)

Trends in Average Reading Scale Scores by Region, 1971 to 1996

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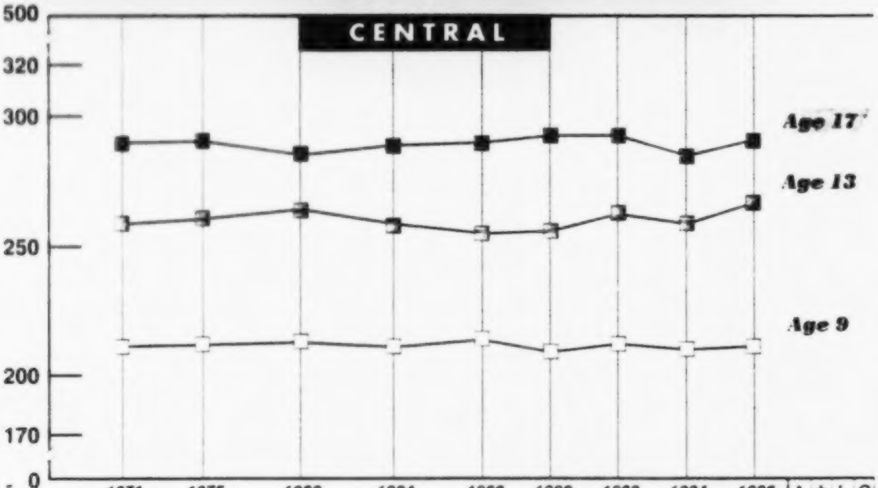
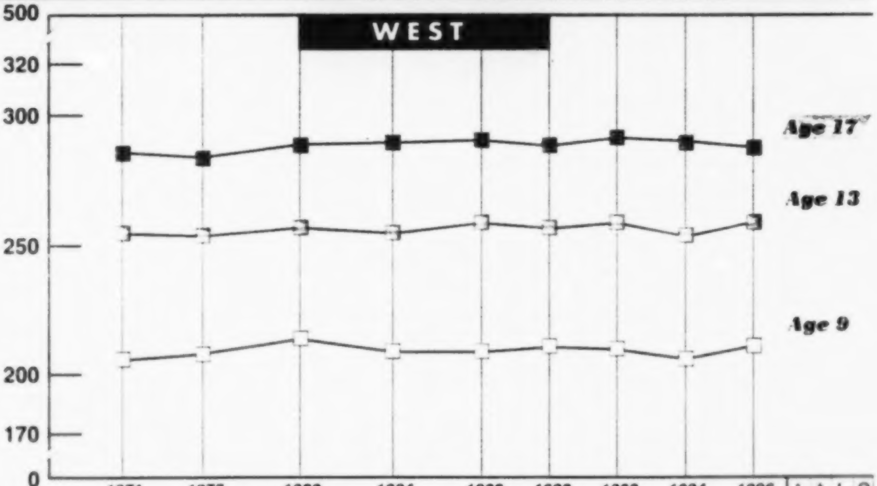


	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	291(2.1) 30(2.4)	292(1.4) 30(1.2)	287(2.2) 28(3.2)	290(1.4) 27(1.7)	291(1.9) 26(1.8)	294(2.4) 27(1.0)	294(2.1) 25(0.8)	286(3.7) 26(1.4)	292(2.1) 25(0.9)				
Age 13	260(1.8) 29(2.2)	262(1.4) 28(1.3)	265(1.4) 26(3.5)	259(1.0) 27(1.6)	256(2.0) 26(2.0)	257(1.5) 24(0.7)	264(3.0) 26(1.0)	260(3.3) 27(1.6)	268(1.8) 22(1.1)	+			
Age 9	215(1.2) 29(2.0)	216(1.2) 26(1.2)	217(1.4) 25(3.4)	215(1.5) 27(1.3)	218(2.2) 24(0.6)	213(2.0) 25(0.7)	216(1.6) 28(1.1)	214(2.3) 26(1.0)	215(2.7) 25(1.2)				



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	284(1.8) 24(2.4)	282(1.9) 25(1.1)	287(2.1) 28(2.3)	288(1.1) 26(0.6)	289(1.8) 28(1.1)	287(2.6) 28(0.9)	290(2.3) 29(1.0)	288(2.8) 27(0.9)	286(2.4) 29(2.1)				
Age 13	254(1.3) 23(2.3)	253(1.7) 26(1.1)	256(2.0) 26(2.3)	254(0.9) 27(0.5)	258(2.1) 28(1.0)	256(1.6) 30(0.9)	258(1.6) 29(1.2)	253(2.1) 31(1.1)	258(1.7) 30(2.2)				
Age 9	205(2.0) 23(1.9)	207(2.0) 25(1.1)	213(1.8) 28(2.1)	208(1.5) 28(0.5)	208(2.6) 29(1.1)	210(2.8) 29(0.8)	209(2.3) 27(0.9)	205(2.8) 28(1.0)	210(2.0) 28(2.4)				

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1971.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Reading Scale Scores by Parents' Highest Level of Education from 1971 to 1996

Educators continue to express concern for the literacy development of students who are considered to be "at risk" (that is, students who are in circumstances that inhibit academic achievement). It has become increasingly clear that environmental influences outside of school are at least as important as classroom experiences in helping students to develop the skills and motivations for becoming lifelong readers and learners.[15] One factor that may be related to a supportive environment for literacy development is the education level of students' parents.

Figure 5.8 presents information regarding levels of parents' education reported by students and the average student reading scale scores associated with them. It is noteworthy that there has been a decrease since 1971 in the percentage of students at all ages who reported that neither of their parents had finished high school. A corresponding increase was observed in the percentage of students at all ages who reported that at least one of their parents had pursued post-high school education. It should also be noted that across the trend assessments approximately one-third of 9-year-olds and one-tenth of 13-year-olds responded "I don't know" to the question about their parents' highest level of education. Furthermore, some research has revealed the potential for young children to provide inaccurate reports about such information.[16]

As in previous NAEP assessments, the 1996 results indicated that students who reported higher levels of parental education attained higher average reading scores. However, at ages 9 and 13 the differences in average scores were not statistically significant between students whose parents' highest level of education was high school graduation and their peers whose parents had not graduated from high school.

At age 17, trend analysis revealed a pattern of improved performance across the assessment years for students who reported the lowest level of parental education, less than high school graduation. However, the 1996 average score for this group of students remained at a level not significantly different from that in 1971. Among students who reported that high school graduation was their parents' highest level of education, average scores fluctuated only slightly during the 1970s and 1980s, but have declined during the 1990s. The overall pattern was one of decreasing scores, resulting in an average score in 1996 that was lower than that in 1971. An overall pattern of declining performance was observed for students who reported that at least one parent had pursued post-high school education, and in 1996 the average score for these students was lower than that in 1971.

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[15] Langer, J. (Ed.). (1987). *Language, literacy, and culture: Issues of society and schooling.* Norwood, NJ: Ablex.

Snow, C., Barnes, W., Chandler, J., Goodman, I., & Hemphill, L. (1991). *Unfilled expectations: Home and school influences on literacy.* Cambridge, MA: Harvard University Press.

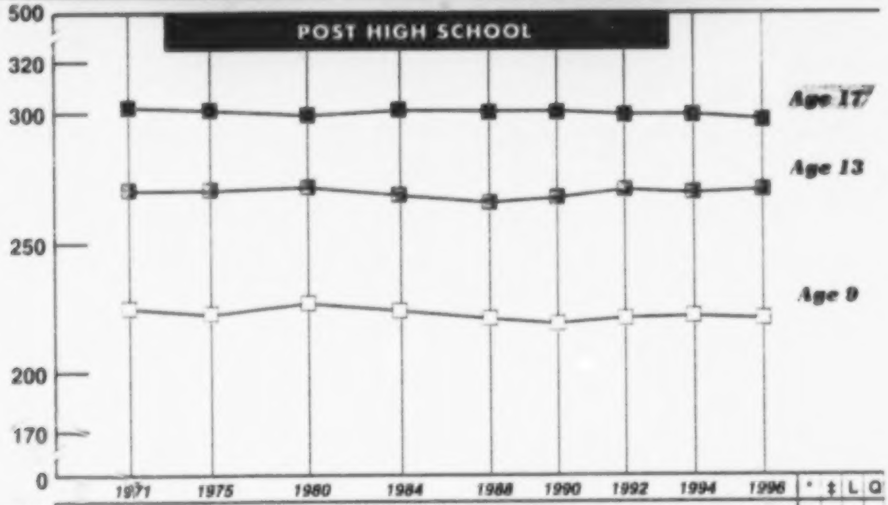
[16] Looker, E. D. (1989). Accuracy of proxy reports of parental status characteristics. *Sociology of Education, 62*(4), 257-276.

Although slight fluctuations were apparent, there were no significant changes from 1971 to 1996 in the average scores for 13-year-olds who reported that neither parent had graduated from high school or that at least one parent had pursued post-high school education. Thirteen-year-olds who reported that the highest level of education for either of their parents was high school graduation displayed an overall decline in performance. However, the average score for these students in 1996 did not differ significantly from that in 1971.

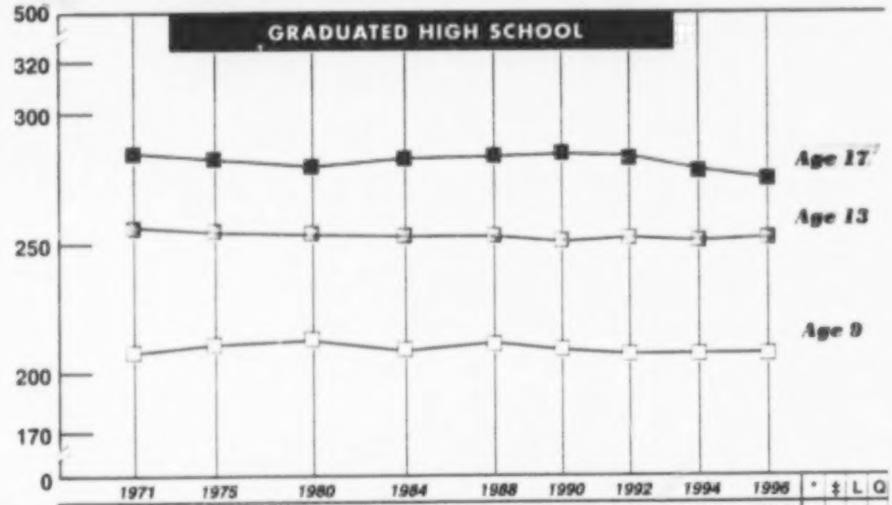
Among 9-year-olds, no significant changes were observed across the assessment years in the average scores of students who reported that neither parent had graduated from high school or that the highest level attained by either parent was high school graduation. At the highest level of parental education (post-high school) the overall pattern was one of decreasing performance across the assessment years, although there was no significant difference between the 1996 and 1971 average scores.

Figure 5.8

Trends in Average Reading Scale Scores by Parents' Highest Level of Education, 1971 to 1996



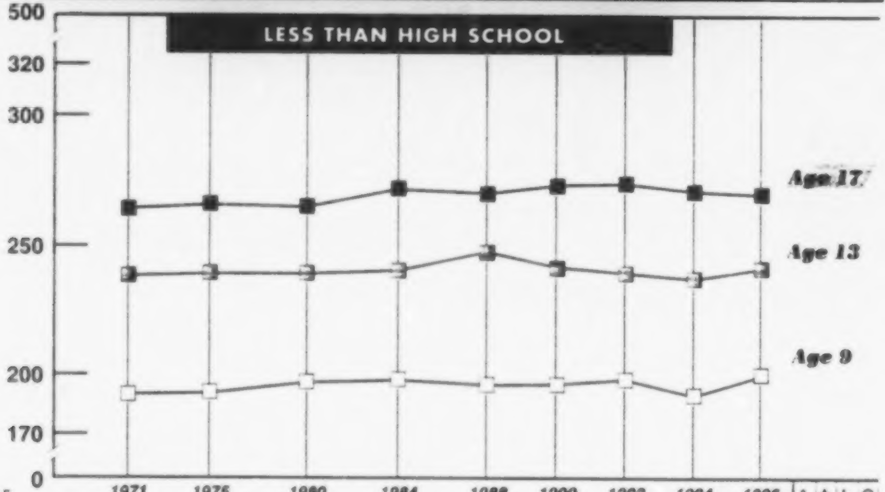
	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	302(1.0) 42 (1.1)	301(0.7) 46(0.8)	299(1.0) 51(1.3)	301(0.7) 50(1.2)	300(1.3) 58(1.6)	300(1.1) 58(1.3)	299(1.4) 61(1.4)	299(1.4) 62(1.4)	297(1.2) 63(1.7)	–		–	
Age 13	270(0.8) 38(1.1)	270(0.8) 40(0.9)	271(0.8) 49(1.3)	268(0.7) 46(1.1)	265(1.4) 52(1.5)	267(1.0) 50(1.5)	270(1.4) 57(1.6)	269(1.2) 57(1.5)	270(1.2) 56(1.6)				
Age 9	224(1.1) 33(0.9)	222(0.9) 34(0.7)	226(1.1) 40(1.5)	223(0.9) 37(1.0)	220(1.7) 45(1.4)	218(2.0) 42(1.3)	220(1.4) 45(0.9)	221(1.3) 46(1.2)	220(1.4) 45(0.9)			–	



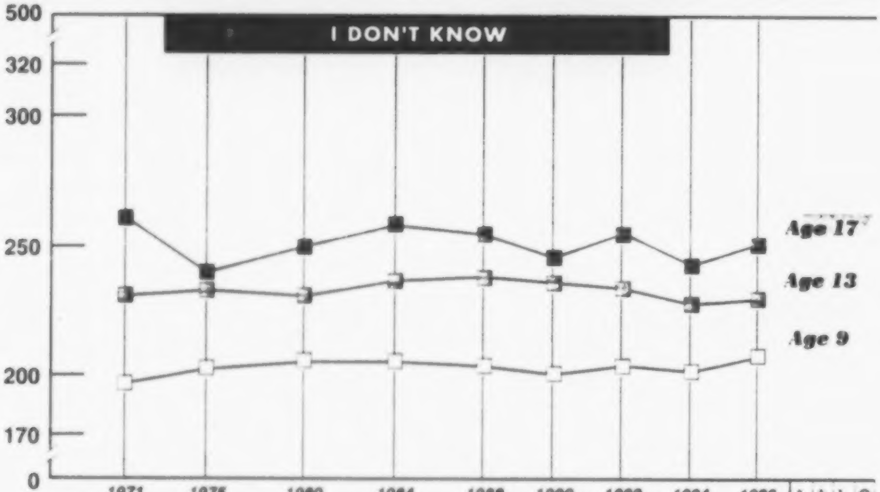
	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	283(1.2) 31(0.8)	281(1.1) 34(0.5)	278(1.0) 32(0.9)	281(0.7) 35(1.0)	282(1.3) 30(1.2)	283(1.4) 30(1.0)	281(1.6) 28(0.9)	276(1.9) 27(1.1)	273(1.7) 27(1.5)	–		–	–
Age 13	256(0.8) 32(0.7)	255(0.7) 33(0.6)	254(0.9) 31(0.7)	253(0.7) 36(1.0)	253(1.2) 31(1.1)	251(0.9) 31(1.2)	252(1.7) 28(1.2)	251(1.4) 27(1.2)	252(1.4) 29(1.4)			–	
Age 9	208(1.2) 22(0.5)	211(0.9) 24(0.4)	213(1.3) 25(0.8)	209(1.0) 20(0.6)	211(2.2) 16(0.6)	209(1.8) 17(0.8)	207(1.5) 16(0.8)	207(2.6) 16(0.8)	207(2.1) 15(0.7)				

Figure 5.8 (continued)

Trends in Average Reading Scale Scores by Parents' Highest Level of Education, 1971 to 1996



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	261(1.5) 20(0.8)	263(1.3) 16(0.6)	262(1.5) 13(0.7)	269(1.1) 12(0.6)	267(2.0) 9(0.8)	270(2.8) 9(0.6)	271(3.9) 8(0.8)	268(2.7) 7(0.5)	267(3.2) 7(0.6)			+	
Age 13	238(1.3) 16(0.6)	239(1.2) 14(0.6)	239(1.1) 10(0.6)	240(0.9) 9(0.4)	247(2.1) 8(0.6)	241(1.8) 8(0.6)	239(2.6) 6(0.5)	237(2.4) 7(0.6)	241(2.7) 5(0.5)				
Age 9	189(1.5) 10(0.4)	190(1.3) 10(0.4)	194(1.6) 7(0.5)	195(1.4) 6(0.2)	193(4.9) 5(0.6)	193(3.2) 5(0.5)	195(4.5) 5(0.4)	189(4.0) 4(0.4)	197(3.6) 4(0.4)				



	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	261(5.0) 7(0.8)	240(2.8) 4(0.2)	250(3.5) 4(0.4)	257(2.0) 3(0.2)	255(6.2) 2(0.3)	246(5.7) 3(0.3)	255(5.9) 3(0.3)	243(5.2) 3(0.4)	251(5.0) 3(0.2)				
Age 13	233(1.0) 14(0.8)	235(1.1) 13(0.6)	233(1.7) 10(0.7)	237(1.3) 10(0.4)	240(3.0) 9(0.7)	238(1.9) 11(0.6)	236(2.6) 9(0.5)	230(3.0) 9(0.7)	232(2.5) 10(0.5)				–
Age 9	197(1.0) 35(0.7)	203(0.8) 32(0.8)	206(1.0) 28(1.0)	204(0.7) 38(0.9)	204(1.5) 34(1.3)	201(1.5) 36(1.1)	204(1.2) 34(1.3)	202(1.3) 34(0.8)	208(1.4) 36(0.9)	+	+	+	

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1971.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Reading Scale Scores by Type of School from 1980 to 1996

Students' average reading scale scores by type of school attended are shown in Figure 5.9. Results by school type were first reported in the 1980 trend assessment. Examination of data collected from 1980 through 1996 indicates that the relative percentages of students attending nonpublic versus public schools have remained relatively stable since 1980.[17]

Numerous factors contributing to the differential academic performance of public and nonpublic school students have been highlighted by research. Although some studies point to instructional and policy differences between the two types of schools to explain the higher performance of private school students,[18] other studies have suggested that student selection and parental involvement are more significant contributors to the performance differences.[19] In 1996, 9- and 13-year-olds attending nonpublic schools demonstrated higher average reading scores than did students attending public schools. At age 17, the difference between average scale scores for public and nonpublic school students was not statistically significant.

Public School Students. The average scores for 17-year-olds attending public schools showed improvement from 1980 to 1990 but have since declined. In 1996, the average score for this age group did not differ significantly from the 1971 average score. At age 13, students demonstrated little change in performance across the trend assessments, with no significant differences or overall pattern of increasing or decreasing scores. The average score of 9-year-old public school students declined after the 1980 assessment and has remained relatively consistent since 1984. Although the overall trend was negative, no significant difference was observed between the 1996 and 1980 average scores.

Nonpublic School Students. For 17-year-olds attending nonpublic schools, improved performance between 1980 and 1990 was followed by a period of decline. However, the decline observed between 1994 and 1996 and the difference between 1971 and 1996 average scores were not statistically significant. No significant changes between 1980 and 1996 were observed in the average scores of 9- and 13-year-olds.

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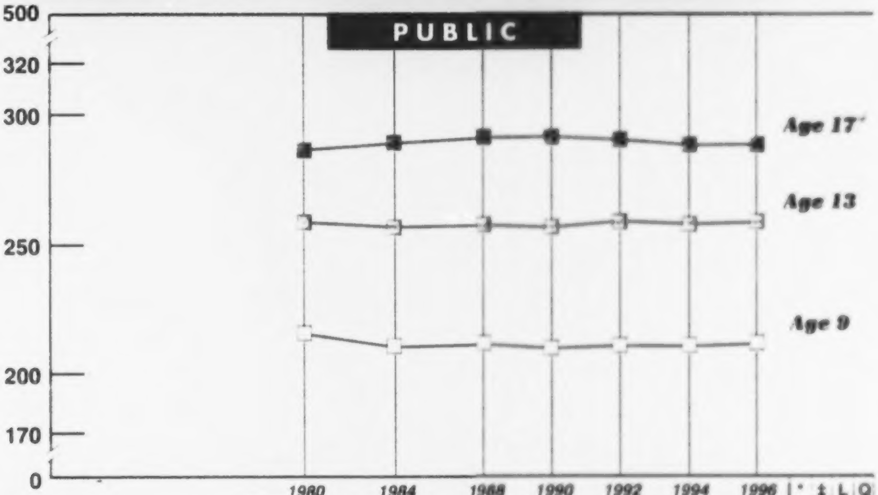
[17] Nonpublic schools include Catholic and other private schools.

[18] Coleman, J., Hoffer, T., & Kilgore, S. (1982). Cognitive outcomes in public and private schools. *Sociology of Education*, 55, 65-76.

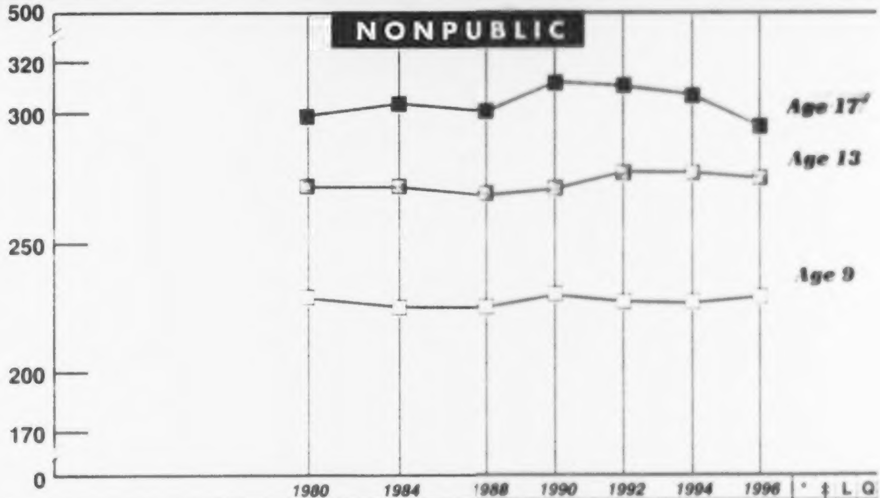
[19] Alexander, K.L., & Pallas, A.M. (1983). Private schools and public policy: New evidence on cognitive achievement in public and private schools. *Sociology of Education*, 56, 170-182.

Figure 5.9

Trends in Average Reading Scale Scores by Type of School, 1980 to 1996



	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	284(1.2) 93(1.2)	287(0.6) 89(1.7)	289(1.0) 88(3.5)	289(1.1) 93(1.5)	288(1.0) 92(1.9)	286(1.5) 89(2.3)	286(1.1) 92(1.7)				–
Age 13	257(1.1) 88(1.3)	255(0.6) 88(1.1)	256(1.0) 89(2.5)	255(0.8) 88(1.9)	257(1.3) 86(1.9)	256(1.0) 89(1.5)	257(1.1) 89(2.1)				
Age 9	214(1.1) 89(1.4)	209(0.8) 87(1.7)	210(1.2) 88(2.7)	208(1.4) 92(1.9)	209(1.0) 88(1.7)	209(1.4) 89(2.1)	210(1.1) 86(1.6)			–	+



	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Age 17	298(2.7) 7(1.2)	303(2.0) 11(1.7)	310(3.8) 12(3.5)	311(4.2) 7(1.5)	310(4.2) 8(1.9)	306(5.8) 11(2.3)	294(5.7) 8(1.7)				–
Age 13	271(1.5) 12(1.3)	271(1.7) 12(1.1)	268(2.8) 11(2.5)	270(2.9) 12(1.9)	276(2.6) 14(1.9)	276(3.4) 11(1.5)	274(3.3) 12(2.1)				
Age 9	227(1.8) 11(1.4)	223(1.6) 13(1.7)	223(3.0) 12(2.7)	228(3.3) 8(1.9)	225(2.3) 12(1.7)	225(2.7) 11(2.1)	227(3.1) 14(1.6)				

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1980.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Summary

- The reading scores of 9-year-olds increased until 1980, but did not continue to improve after that time. At age 13, trend analysis revealed an overall pattern of increasing performance. At both ages 9 and 13, the 1996 average score was higher than the 1971 average. Despite an overall trend toward higher scores for 17-year-olds, the absence of recent gains resulted in an average score in 1996 that did not differ significantly from that in 1971.
- The percentages of 9-year-olds at or above Levels 150, 200, and 250 on the NAEP reading scale was higher in 1996 than in 1971. At age 13, there were increases between 1971 and 1996 in the percentages of students who performed at or above Levels 250, 300, and 350. Increases were also observed for 17-year-olds at or above Levels 200 and 250.
- The overall pattern of average scores across the nine assessments for students in each age group in the upper quartile is one of increased performance. However, the 1996 average score for the top 25 percent of students was significantly higher than the 1971 average for only 9- and 13-year-olds. In the middle two quartiles, the 1996 average scores for 9- and 13-year-olds were higher than the 1971 averages. Despite an overall trend of increased performance for 17-year-olds in this performance range, no significant difference was observed between 1996 and 1971 average scores. In the lower quartile, both 9- and 17-year-old students attained an average score in 1996 that was higher than that in 1971. Early gains that were made by 13-year-olds in the lower quartile have not been maintained, and the 1996 average score was not significantly different from the 1971 average.
- For White students in each age group, an overall pattern of increased performance was present across the assessment years. Among 9- and 13-year-olds, these gains resulted in a 1996 average score that was higher than that in 1971. Black students in each age group have also demonstrated a trend of performance gains since 1971. Although this pattern has reversed during the 1990s, the average score for each age group in 1996 remained higher than the average score in 1971. Among Hispanic students, no overall pattern of increasing or decreasing scores was apparent for 9- and 13-year-olds. Nonetheless, the average score of 9-year-olds in 1996 was higher than that in 1975. At age 17, a period of improvement from 1975 to 1990 was followed by a period of decline, resulting in a 1996 average score that did not differ significantly from that in 1975.
- In 1996, White students in all three age groups outperformed their Black and Hispanic peers. At all three ages, a trend toward smaller gaps between White and Black students' average reading scores is evident across the assessment years. However, for 13- and 17-year-olds this trend shows signs of reversing since the 1988 assessment. Nevertheless, for both 9- and 17-year-olds the gap between White and Black students in 1996 was smaller than it was in 1971. The gap between White and Hispanic students has not changed significantly since 1975 for 9- and 13-year-olds. At age 17, although the gap between White and Hispanic students appeared to have decreased between 1975 and 1990, this trend has not continued into the 1990s. The gap between White and Hispanic 17-year-old students' average scores in 1996 was not significantly different than that in 1975.

- Male 9-year-olds showed overall improvement across the assessment years. Despite relatively little change in recent assessments, their average score in 1996 remained higher than in 1971. For male students aged 13, no significant changes were observed. At age 17, male students' performance declined after a period of gains from 1971 to 1988, resulting in a 1996 average score that did not differ significantly from that in 1971. Although overall gains were not observed for 9-year-old female students, the average score in 1996 for this group was higher than the average in 1971. Both 13- and 17-year-old female students demonstrated overall gains across the nine assessments. However, the 1996 average score was significantly higher than the 1971 average for 13-year-olds, but not for 17-year-olds.

- In 1996, the average reading scores of female students were higher than those of male students in each age group. For 9-year-olds this gap has remained relatively consistent since 1971. At ages 13 and 17, there was some evidence of a trend toward smaller, then larger gaps since the 1980s, but the 1996 gap did not differ significantly from that in 1971.

- For all three age groups in the Northeast, the trend results reveal no overall pattern of increasing or decreasing scores. However, 9-year-old students in the Northeast attained an average score in 1996 that was higher than that in 1971. In the Southeast, the average score for 9-year-olds fluctuated across the nine assessments, but was higher in 1996 than in 1971. For 13- and 17-year-olds in the Southeast, a period of increasing scores until 1988 was followed by a period of decline, resulting in 1996 average scores that were not significantly different from 1971 averages. For 9- and 17-year-olds in the Central region, no significant changes were observed. At age 13, however, students in the Central region attained an average score in 1996 that was higher than that of their counterparts in 1971. For students at all three ages in the West region, no significant changes were observed across the assessment years.

- In 1996, a few significant differences in reading scores were observed between regions. At age 9, students in the Northeast outperformed their peers in the Southeast and West regions. At age 13, students in the Central region outperformed their peers in the Southeast and West regions. And at age 17, students in the Northeast and Central regions outperformed their peers in the Southeast.

- At all three ages, the percentage of students who reported that at least one of their parents had pursued post-high school education increased between 1971 and 1996. For 9-year-olds who reported this highest level of parental education, results from the nine trend assessments indicated an overall trend of decreasing performance. However, the 1996 average score for this group did not differ significantly from the 1971 average. At age 13, a similar pattern of declining scores was observed for students who reported high school graduation as their parents' highest level of education, although the 1996 and 1971 average scores did not differ significantly. Among 17-year-olds, students who reported the lowest level of parental education displayed a trend toward higher scores across the assessment years, but the average score of this group in 1996 was not significantly different from that in 1971. For 17-year-olds who reported the two highest levels of parental education, trend analyses revealed an overall pattern of declining scores, resulting in 1996 averages that were lower than those in 1971.

- In 1996, the average reading scores of 9- and 13-year-old students attending nonpublic schools were higher than those of their peers attending public schools. The difference between 17-year-old nonpublic and public school students was not statistically significant. Although the overall trend for 9-year-olds in public schools was one of declining performance, relative stability during the last decade resulted in a 1996 average score that was not significantly different from that in 1980. The average scores for 9-year-olds attending nonpublic schools and for 13-year-olds attending either nonpublic or public schools have not changed significantly since 1980. Among 17-year-olds, the average scores for students in both school types increased during the 1980s but declined thereafter, resulting in 1996 average scores that were not significantly different from 1980 averages.

Chapter 6

Students' Experiences in Reading

Children learn to read through a variety of instructional experiences afforded them by concerned educators. However, the factors that contribute to students' developing reading abilities are numerous and extend beyond the activities of the classroom. In recent years, a growing body of research has pointed to the key role played by the family and home environment in students' reading achievement.[20] This chapter examines trends in students' school and home environments related to literacy development. Since 1984, and in some cases 1971, NAEP has asked students to respond to survey questions about their experiences related to reading development. This information is valuable in helping parents, educators, and policy makers understand how literacy develops and what aspects of a student's experience are related to achievement in reading.

Reading Across the Curriculum

The amount of reading and the types of materials read as a part of instruction are central to the process of learning to read. As such, increased emphasis is being placed on giving students a variety of materials to read and opportunities to use their developing skills as a tool for learning. Most experts agree that developing into a lifelong reader requires exposure to a diverse range of materials and ample opportunities to gain practice in reading.[21] Because of the importance placed on reading across the content areas, NAEP trend assessments have asked students to report the total number of pages they read as assigned schoolwork per day, including reading at both school and home.

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[20] Kellaghan, T., Sloane, K., Alverez, B., & Bloom, B. S. (1993). *The home environment and school learning: Promoting parental involvement in the education of children.* San Francisco: Jossey-Bass.

[21] Flood, J., & Lapp, D. (1994). Developing literary appreciation and literacy skills: A blueprint for success. *The Reading Teacher, 48*(1), 76-79.

Turner, J., & Paris, S. G. (1995). How literacy tasks influence children's motivation for literacy. *The Reading Teacher, 48*(8), 662-673.

Table 6.1 presents students' reports on the number of pages they read per day in school and for homework and their average reading scale scores in both 1984 and 1996. The results indicate that students aged 9 and 13 reported reading more pages per day in 1996 than in 1984. However, no significant changes were observed for students aged 17. Among 9-year-olds, a greater percentage of students reported reading 20 or more pages and a smaller percentage reported reading 5 or fewer pages each day in 1996 than in 1984. At age 13, a greater percentage of students reported reading 20 or more pages and a smaller percentage reported reading 6 to 10 pages each day in 1996 than in 1984.

Table 6.1

Pages Read Per Day in School and for Homework, 1984 and 1996

THE NATION'S REPORT CARD naep

		AGE 9		AGE 13		AGE 17	
Number of Pages...	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
More than 20	1996	17 (1.0) *	218 (2.3)	14 (0.7) *	260 (2.2)	21 (1.1)	300 (3.1)
	1984	13 (0.4)	215 (1.4)	11 (0.4)	261 (1.2)	20 (1.0)	299 (1.0)
16 - 20	1996	16 (0.9)	217 (2.0)	13 (0.6)	263 (2.1)	14 (0.7)	295 (2.1)
	1984	13 (0.5)	215 (1.2)	11 (0.2)	263 (1.0)	14 (0.4)	296 (0.9)
11 - 15	1996	15 (0.7)	218 (2.1)	18 (0.8)	266 (2.0)	18 (0.8)	291 (2.1)
	1984	14 (0.5)	220 (1.2)	18 (0.4)	264 (0.9)	18 (0.3)	294 (0.8)
6 - 10	1996	25 (1.0)	215 (1.7)	31 (0.8) *	262 (1.3)	25 (1.0)	284 (1.5)
	1984	25 (0.5)	215 (1.0)	35 (0.5)	261 (0.6)	26 (0.6)	287 (0.8)
5 or fewer	1996	26 (1.1) *	203 (1.6) *	25 (1.0)	251 (1.4)	22 (0.8)	271 (2.5)
	1984	35 (1.0)	208 (0.8)	27 (0.6)	250 (0.7)	21 (0.8)	273 (0.8)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

As in past NAEP assessments, a relationship between reading scale scores and the number of pages read each day was apparent in the 1996 results. At all three ages, students who reported reading 5 or fewer pages per day for school and homework had lower average scores than students who reported reading more pages. Additionally, 17-year-olds who reported reading only 6 to 10 pages each day had lower average scores than their peers who read 16 or more pages. The results may be viewed as one piece of evidence supporting the assertions of many educators and researchers that reading across the curriculum is an important aspect of students' overall reading development.[22]

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[22] Davenport, M. R., Jaeger, M., & Lauritzen, C. (1995). Integrating curriculum: Negotiating curriculum. *The Reading Teacher, 49*(1), 60-62.

Farnan, N. (1996). Connecting adolescents and reading: Goals at the middle level. *Journal of Adolescent & Adult Literacy, 39*(6), 436-445.

Another aspect of students' literacy experiences that contributes to the depth and breadth of their developing skills is their exposure to a wide variety of reading materials. Since 1984, NAEP has asked students to identify which of several types of texts they read a few times a year or more. The types of texts asked about included: poems, plays, biographies, science books, and books about other places. Table 6.2 presents students' responses.

Although some increases were observed in students' reports about exposure to certain types of texts at ages 13 and 17, this was not the case at age 9. According to the reports of 9-year-olds, fewer students were reading poems and plays in 1996 than in 1984. However, at age 13 there was an increase in the percentage of students who reported reading both of these types of materials. Among 17-year-olds, an increase between 1984 and 1996 was observed in the percentages who reported reading biographies and science books.

Table 6.2

Reading Certain Types of Materials a Few Times a Year or More Frequently, 1984 and 1996

Types of Materials...		PERCENT OF STUDENTS		
		AGE 9	AGE 13	AGE 17
Poems	1996	60 (1.9) *	80 (1.9) *	80 (1.8)
	1984	70 (1.5)	68 (1.3)	76 (1.1)
Plays	1996	42 (2.3) *	67 (2.1) *	67 (1.6)
	1984	56 (1.4)	59 (1.4)	63 (1.0)
Biographies	1996	46 (2.4)	65 (2.6)	66 (1.7) *
	1984	45 (1.5)	62 (1.3)	59 (1.2)
Science Books	1996	83 (2.2)	90 (1.9)	82 (2.0) *
	1984	84 (1.3)	90 (1.1)	70 (1.1)
Books About Other Places	1996	78 (1.6)	84 (1.8)	81 (1.9)
	1984	79 (1.2)	83 (1.1)	81 (0.9)

Standard errors of the estimated percentages appear in parentheses.

* Indicates that the percentage in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Time Spent on Homework for All Subjects

Another important aspect of students' educational achievement is the time they devote to homework. Table 6.3 presents students' responses regarding time spent on homework and their average reading scale scores. Significant changes were observed at age 9. Among 9-year-olds, the percentage of students who reported not having homework assigned was lower in 1996 than in 1984. Correspondingly, the percentage of students who reported doing less than 1 hour each day increased. However, fewer students reported doing more than 2 hours of homework each day. No significant changes between 1984 and 1996 were observed in the reports of 13- and 17-year-olds regarding the amount of time spent on homework each day.

In 1996, the relationship between amount of time spent on homework and average reading scores varied across the three age groups. Among 9-year-olds, students who reported doing more than 2 hours of homework each day had lower average scores than students who reported doing 1 to 2 hours or less than 1 hour of homework. These results may reflect the additional homework assigned to lower achieving students, or the additional time that these students may require to complete the regularly assigned homework. Nine-year-olds who reported not doing assigned homework had lower average reading scores than students who reported doing 1 to 2 hours or less than 1 hour of homework. Also, 9-year-olds who reported not having homework assigned had lower scores than students who reported doing 1 to 2 hours on homework each day. Students aged 13 and 17 who reported spending 1 hour or more on homework each day had higher reading scores on average than their peers who reported not doing homework or not having homework assigned. Additionally, 17-year-olds who reported doing more than 2 hours of homework each day had a higher average reading score than did students who reported doing 1 to 2 hours or less than 1 hour of homework.

Table 6.3 Amount of Time Spent on Homework for All Subjects, 1984 and 1996

Amount of Homework...	Year	AGE 9 Percent of Students	AGE 9 Average Scale Score	AGE 13 Percent of Students	AGE 13 Average Scale Score	AGE 17 Percent of Students	AGE 17 Average Scale Score
None	1996	26 (1.6) *	210 (2.0)	22 (1.8)	256 (1.3)	23 (1.4)	273 (1.9)
	1984	36 (1.3)	213 (0.9)	23 (0.8)	254 (0.8)	22 (0.9)	276 (0.7)
Didn't Do Assigned Homework	1996	4 (0.3)	195 (5.4)	5 (0.5)	251 (3.3)	13 (0.6)	281 (2.2)
	1984	4 (0.3)	199 (2.1)	4 (0.2)	247 (1.7)	11 (0.3)	287 (1.2)
Less than 1 Hour	1996	53 (1.5) *	215 (1.0)	37 (1.2)	259 (1.6)	28 (0.9)	288 (1.5)
	1984	42 (1.0)	218 (0.7)	36 (0.7)	261 (0.6)	26 (0.4)	290 (0.8)
1 - 2 Hours	1996	13 (0.7)	220 (2.2)	27 (1.2)	267 (1.6)	24 (1.0)	295 (2.1)
	1984	13 (0.5)	216 (1.3)	29 (0.5)	266 (0.7)	27 (0.5)	296 (0.8)
More than 2 Hours	1996	4 (0.3) *	198 (4.7)	8 (0.9)	269 (2.3)	11 (0.7)	307 (3.4)
	1984	6 (0.2)	201 (1.8)	9 (0.3)	265 (1.2)	13 (0.6)	303 (1.1)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Extent of Reading in the Home at Ages 13 and 17

Social and cultural influences on reading development have received increased attention among educators and researchers in recent years.[23] Not only have researchers come to recognize the important role of family support for literacy, but educators and policy makers are increasingly focusing their attentions on building stronger links between home and school to support students' educational growth.[24] One way in which the home environment can support literacy development is the modeling of reading habits by parents or other adults in the home. Children may come to value the use of literacy materials by observing the important people in their lives engaged in such activities. Furthermore, some research has highlighted the significant effects of home reading activities on both students' reading achievement and their attitudes toward reading.[25]

Since 1984, NAEP has asked 13- and 17-year-olds about the extent of reading in their homes. Students were asked to report how often adults they lived with read newspapers, magazines, or books. Students were grouped in three categories: those who reported that the adults they lived with never read newspapers, magazines, or books, or read these materials very infrequently (i.e., yearly or monthly); those who reported that the adults they lived with read these materials on a weekly basis; and those who said they lived with an adult who read these materials on a daily basis. Table 6.4 presents results from 1984 and 1996 concerning this important aspect of students' home environment.

No significant changes were observed between the two assessment years in students' reports about the extent of reading in their homes. In 1996, the reports of students in both age groups were quite similar: over 80 percent reported that reading newspapers, magazines, or books occurred in their homes on at least a weekly basis. However, 18 percent of 13-year-olds and 16 percent of 17-year-olds reported that reading took place in their homes monthly or less frequently. These students had lower average reading scores than their peers who reported weekly or daily reading activities in their homes.

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[23] Chall, J. S., Jacobs, V. A., & Baldwin, L. E. (1990). *The reading crisis: Why poor children fall behind.* Cambridge, MA: Harvard University Press.

Stevenson, J., & Fredman, G. (1990, July). The social environmental correlates of reading ability. *Journal of Child Psychiatry*, 681-698.

[24] Christenson, S. L. (1992). Family factors and student achievement: An avenue to increase students' success. *School Psychology Quarterly, 7*(3), 178-206.

Morrow, L. M. (Ed.). (1995). *Family literacy: Connections in schools and communities.* Newark, DE: International Reading Association.

[25] Fox, B. J., & Wright, M. (1997). Connecting school and home literacy experiences through cross-age reading. *The Reading Teacher, 50*(5), 396-403.

Rowe, K. J. (1991, February). The influence of reading activity at home on students' attitudes toward reading, classroom attentiveness, and reading achievement: An application of structural equation modeling. *British Journal of Educational Psychology, 61*, 19-35.

Table 6.4

Extent of Reading by Adults in the Home, 1984 and 1996

Extent of Reading in the Home...	Year	AGE 13		AGE 17	
		Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Never/Yearly/Monthly	1996	18 (1.8)	245 (4.5)	16 (2.3)	270 (4.3)
	1984	16 (1.0)	245 (2.0)	14 (0.8)	268 (2.3)
Weekly	1996	40 (2.1)	263 (3.4)	45 (2.4)	286 (3.1)
	1984	43 (1.1)	259 (2.0)	44 (1.1)	288 (1.5)
Daily	1996	42 (2.3)	267 (2.8)	39 (2.2)	294 (3.7)
	1984	41 (0.9)	263 (1.8)	42 (1.4)	292 (1.6)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Exposure to Reading Materials in the Home

The availability of reading materials in the home increases opportunities for students to develop as readers and also demonstrates for students the importance of literacy in our daily lives. Because of the potentially significant effects of access to reading materials on students' reading development, NAEP has asked students since 1971 whether they have access to newspapers, magazines, books, and encyclopedias in their homes. Students' responses and average scale scores in 1971 and 1996 are presented in Table 6.5.

Overall, the results indicated a decline in the number of reading materials in the home between 1971 and 1996. At age 9, a smaller percentage of students in 1996 than in 1971 reported having all four types and a greater percentage reported having 2 or fewer types in their homes. At ages 13 and 17, the percentage of students who reported having all four types of reading materials also dropped, while the percentage who reported having 3 or fewer types of materials increased.

Data from 1996 relating the number of different types of reading materials in the home to students' average reading scores indicated a clear pattern across all three age groups: more types of reading materials in the home was associated with higher average reading scores.

Table 6.5 Numbers of Reading Materials in the Home, 1971 and 1996

Numbers of Types of Materials in the Home...		AGE 9		AGE 13		AGE 17	
	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
0 - 2	1996	35 (1.4) *	199 (1.7) *	22 (0.8) *	240 (1.3) *	18 (0.9) *	266 (2.6) *
	1971	28 (0.8)	186 (1.0)	17 (0.6)	227 (1.3)	11 (0.6)	246 (1.8)
3	1996	35 (1.1)	215 (1.5) *	32 (0.7) *	257 (1.3) *	28 (1.1) *	285 (1.6) *
	1971	33 (0.4)	208 (1.0)	25 (0.5)	249 (0.9)	22 (0.5)	274 (1.4)
4	1996	30 (1.1) *	226 (1.7)	46 (1.0) *	271 (1.3)	53 (1.3) *	295 (1.5)
	1971	39 (0.9)	223 (0.9)	58 (1.0)	267 (0.7)	67 (0.9)	296 (1.0)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1971.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Independent Reading Habits

Choosing to spend time reading independently may be one indication of developing lifelong literacy habits. Furthermore, some research has revealed a positive relationship between independent reading and reading achievement.[26] Because of the importance placed by educators and parents on students' independent reading habits, NAEP has asked 9-, 13-, and 17-year-olds since 1984 about how much time they spend reading for fun. Table 6.6 compares the responses provided by students in 1984 and 1996.

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[26] Watkins, M. W., & Edwards, V. A. (1992). Extracurricular reading and reading achievement: The rich stay rich and the poor don't read. *Reading Improvement, 29*(4), 236-242.

No significant changes were observed in the amount of time 9- and 13-year-olds reported reading for fun. At age 17 there was some evidence that students were reading for fun less frequently in 1996 than in 1984: the percentage of 17-year-olds who reported reading for fun daily was lower, and the percentage who reported never reading for fun was higher. These results may be viewed as disappointing, since over a decade ago the publication *Becoming a Nation of Readers: The Report of the Commission on Reading* recommended that "children should spend more time in independent reading."[27] Unfortunately, since 1984 little progress in this area has been observed.

In 1996, 9-year-olds were more likely to read for fun on a daily basis than were 13- or 17-year-olds. Daily reading was reported by more than one-half of students aged 9, but by less than one-third of students aged 13 and by about one-fourth of students aged 17. Based on 1996 results, those students who reported daily reading for fun had higher average reading scores than students who reported never reading for fun.

Table 6.6 Frequency of Reading for Fun, 1984 and 1996

		AGE 9		AGE 13		AGE 17	
Frequency of Reading...	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Daily	1996	54 (1.9)	213 (2.1)	32 (1.9)	270 (3.3)	23 (2.0) *	301 (5.2)
	1984	53 (1.0)	214 (1.1)	35 (1.0)	264 (1.4)	31 (0.8)	297 (1.5)
Weekly	1996	27 (1.8)	212 (2.7)	31 (2.1)	259 (3.1)	32 (2.7)	292 (4.0)
	1984	28 (0.8)	212 (1.7)	35 (1.2)	255 (1.4)	34 (1.1)	290 (1.7)
Monthly	1996	8 (1.0)	210 (5.2)	15 (1.4)	260 (4.5)	17 (1.5)	290 (5.6)
	1984	7 (0.6)	204 (3.3)	14 (0.8)	255 (2.1)	17 (0.5)	290 (1.8)
Yearly	1996	3 (0.5)	*** (***)	9 (1.2)	*** (***)	12 (1.6)	285 (5.6)
	1984	3 (0.3)	197 (4.2)	7 (0.5)	252 (3.6)	10 (0.5)	280 (2.7)
Never	1996	8 (0.8)	199 (4.5)	13 (1.5)	238 (4.7)	16 (2.1) *	269 (5.0)
	1984	9 (0.5)	198 (2.7)	9 (0.6)	239 (2.5)	9 (0.6)	269 (2.4)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[27] Anderson, R. C., Hiebert, E. H., Scott, J. A., & Wilkinson, I. A. G. (1985). *Becoming a nation of readers: The report of the commission on reading.* The National Institute of Education. Wasghinton, DC: US Department of Education.

Students who develop into lifelong readers display numerous literacy habits and practices. For example, discussing and sharing books with others has been identified as an important literacy activity.[28] Social interaction related to reading may help students view themselves as contributing members of a literacy community. Students who borrow books from the library or who buy books demonstrate a commitment to reading and their own literacy development. Students who seek, select, and read books written by an author they prefer show a strategy for reading material selection.[29]

Because of the importance of these activities for literacy development, NAEP reading assessments since 1984 have asked students whether or not they have engaged in four specific reading-related activities: telling a friend about a good book, taking books out of the library, spending their own money on books, and reading more than one book by an author they liked.

Table 6.7 presents the percentages of students in 1984 and 1996 who reported ever engaging in any or all of these four activities, and their average reading scores. The results indicate no significant change since 1984 in the percentage of students engaging in these activities. At all three ages in 1996, one-half or less of the students reported engaging in all four activities. Given the potential importance of these literacy habits, it may be of particular concern that approximately one-fifth of 17-year-olds reported engaging in 0 to 1 of these activities. In all three age groups, students who reported engaging in all four activities had higher average reading scores than students who reported engaging in only 0 to 1 of the activities.

Table 6.7

Engagement in Reading-Related Activities, 1984 and 1996

		AGE 9		AGE 13		AGE 17	
Number of Activities...	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
0 - 1	1996	8 (0.8)	199 (3.4)	14 (1.4)	234 (4.5)	21 (2.2)	268 (5.5)
	1984	10 (0.5)	205 (2.5)	12 (0.8)	242 (2.1)	17 (0.8)	271 (1.7)
2	1996	12 (1.0)	207 (5.1)	13 (1.7)	257 (4.1)	9 (1.6)	*** (***)
	1984	16 (0.8)	208 (1.7)	14 (0.8)	246 (2.6)	14 (0.6)	282 (2.1)
3	1996	32 (1.6)	210 (2.7)	25 (2.2)	258 (2.6)	26 (1.7)	284 (3.7)
	1984	31 (1.0)	211 (1.8)	25 (0.9)	255 (1.5)	23 (0.7)	289 (1.8)
4	1996	48 (1.3)	215 (2.1)	48 (1.6)	269 (3.2)	44 (3.1)	304 (3.3)
	1984	44 (1.0)	216 (1.5)	49 (1.1)	264 (1.3)	47 (1.3)	298 (1.6)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[28] Snow, C. E., Barnes, W. S., Chandler, J., Goodman, I. F., & Hemphill, L. (1991). *Unfulfilled expectations: Home and school influences on literacy.* Cambridge, MA: Harvard University Press.

[29] Hiebert, E. H., Mervar, K. B., & Person, D. (1990). Research directions: Children's selection of trade books in libraries and classrooms. *Language Arts, 67*, 758-763.

Summary

- Students aged 9 and 13 reported reading more pages per day in school and for homework in 1996 than did their counterparts in 1984. However, no significant change in pages read per day was observed for 17-year-olds. In 1996, students at all three ages who reported reading 5 or fewer pages each day in school and for homework had lower average scores than students who reported reading more than 5 pages.
- Although the percentages of 9-year-olds who reported reading poems and plays at least a few times a year decreased between 1984 and 1996, there was an increase in the percentage of 13-year-olds who reported reading these materials. At age 17, students' reports indicated an increase between 1984 and 1996 in the reading of biographies and science books a few times a year or more frequently.
- The reports of 9-year-olds indicated an increase between 1984 and 1996 in the amount of time spent on homework each day. No significant changes were observed for 13- and 17-year-olds. In 1996, the relationship between time spent on homework and average reading scores varied somewhat across the three age groups. Among 9-year-olds, students who reported doing more than 2 hours of homework each day had lower average scores than students who spent less than 1 hour or 1 to 2 hours each day. However, the average score of 9-year-old students who reported not having assigned homework was lower than that of students who reported doing 1 to 2 hours of homework. Among 13- and 17-year-olds, doing 1 hour or more of homework each day was associated with higher average reading scores, compared to those of students who did not do their homework or did not have homework assigned. For 17-year-olds, the highest average reading score was attained by students who reported doing at least 2 hours of homework each day.
- No significant changes between 1984 and 1996 were observed in the extent of reading by adults in 13- and 17-year old students' homes. Students in both age groups who reported that adults in their homes read newspapers, magazines, or books on at least a weekly basis had higher average scores than students who reported less frequent reading of these materials by adults in their homes.
- At all three ages, students' reports indicated a decline between 1971 and 1996 in the number of different types of reading materials in the home. In 1996, increased number of types of reading materials in the home was associated with higher average reading scores.
- No significant changes between 1984 and 1996 were observed in the amount of time 9- and 13-year-olds reported that they spent reading for fun. At age 17, there was a decrease in the percentage of students who reported reading for fun on a daily basis, and an increase in the percentage who reported never reading for fun. In 1996, those students in each age group who reported reading for fun on a daily basis had higher average reading scores than their peers who reported never doing so.

- At all three ages, no significant changes between 1984 and 1996 were observed in students' reports about their engagement in reading-related activities: telling a friend about a good book, taking books out of the library, spending their own money on books, and reading more than one book by an author they liked. In 1996, students in each age group who reported that they had engaged in all of these activities had higher average reading scores than their peers who had engaged in 1 or none of these activities.

Part IV Writing

Introduction

Over the past 20 years, our understanding of the writing process and of effective ways to teach writing has evolved. Research and practice now recognize that writing is a recursive process that involves invention and brainstorming, drafting and composing, reflecting and revising, and evaluating and editing.[1] With an emphasis now on the process and not just the finished product, the focus has shifted away from the text and toward the writer. Research has confirmed that students learn to write well by developing an understanding of the dynamics of the writing process.[2] Research also indicates that students are more likely to develop writing competency when they routinely engage in writing various types of texts in all subject areas.[3]

As writing instructional approaches and emphases evolve over time, the NAEP long-term trend assessment in writing provides an important picture of students' progress in this academic area. This section reports results from the six national assessments of writing conducted during the school years ending in 1984, 1988, 1990, 1992, 1994, and 1996. Each of these trend assessments was administered to nationally representative samples of students in grades 4, 8, and 11. To assess the writing performance of the nation's students and to track changes in performance over time, the 1996 assessment included the same set of 12 writing tasks that had been administered in 1984, 1988, 1990, 1992, and 1994. Thus, the same tasks were given to nationally representative samples of students at six different points in time over a 12-year period. In addition to the writing tasks, students were also asked to complete a brief questionnaire about their writing experience and instruction.

The NAEP Long-Term Trend Writing Assessment

Because competence in one type of writing does not necessarily indicate competence in another, the trend writing assessments were designed to examine students' abilities in three types of writing: informative, persuasive, and narrative. Informative tasks asked students to write descriptions, reports, and analyses; persuasive tasks asked students to write convincing letters and arguments; and narrative tasks asked students to write fictional stories.

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[1] Atwell, N. (1988). Making the grade. In T. Newkirk, & N. Atwell (Eds.), *Understanding writing: Ways of observing, learning, and teaching* (2nd edition). Portsmouth, NH: Heinemann.

Spandel, V., & Stiggins, R.J. (1990) *Creating writers.* New York, NY: Longman.

Raber, L.L., & Lindon, J.A. (1992). A look at process writing in the classroom. *Ohio Reading Teacher, 26*(2), 17-19

[2] Goldstein, A.A., & Carr, P. G. (1996). Can students benefit from process writing? *NAEP facts, 1*(3). Washington, DC: National Center for Education Statistics.

[3] Languor, J.A., & Allington, R. (1992). Curriculum researching in reading and writing. In P. Jackson (Ed.), *Handbook of research on curriculum* (pp 687-725). New York, NY: MacMillan.

In all, 12 tasks were administered in the trend assessment: 5 informative tasks, 6 persuasive tasks, and 1 narrative task. Some of the tasks were administered at a single grade, while others were administered at more than one grade. Each assessed student was given only a few of the tasks. A brief description of each writing task, and an indication of the grades at which the task was administered, is provided below.

		Grade		
Tasks	**Summary**	**4**	**8**	**11**
Informative				
Plants	required students to summarize a science experiment depicted in a series of pictures showing different stages of a plant's growth	■		
XYZ Company	required students to complete a letter explaining that a previously ordered T-shirt had not been received and proposing a course of action	■	■	
Food on the Frontier	required students to read a social studies passage about frontier life and then to explain why modern-day food differs from frontier food	■	■	
Appleby House	required students to write a newspaper article based on notes they were given about an unusual haunted house	■	■	■
Job Application	required students to provide a brief description of a desirable job and to summarize their previous experiences or qualifications for it			■
Persuasive				
Spaceship	required students to form their own points of view about whether creatures from another planet should be allowed to return home or be detained for scientific study, and to support their points of view in ways that would convince others to agree with them	■		
Radio Station	required students to provide reasons why their class should be permitted to visit a local radio station despite the manager's specified concerns	■	■	
Dissecting Frogs	required students to take a stand on the dissection of frogs in science class, and to discuss and support their views		■	
Recreation Opportunities	required students to take a stand on whether their town should purchase an abandoned railroad track or a warehouse as a recreation center, to defend their choice, and to refute the alternative choice		■	■
Bike Lane	required students to take a stand on whether or not a bike lane should be installed in their locality, and to refute the opposing view			■
Space Program	required students to adopt a point of view about whether or not funding for the space program should be reduced, and to write a letter to their senators explaining their position			■
Narrative				
Flashlight	required students to write a story about their imagined adventures with a flashlight that has special powers	■		

Students' performance on these writing tasks were evaluated on the basis of their success in achieving the purpose of each task — an approach to the scoring of writing referred to as primary trait scoring.[1] Primary trait scoring focuses on the writer's inclusion of specific features needed to accomplish the purpose of each task. The primary trait scoring criteria, while specific to each writing task, defined five levels of task accomplishment: not rated, unsatisfactory, minimal, adequate, and elaborated. General definitions of these levels are provided below.

A small percentage of responses were blank, indecipherable, completely off-task, or contained a statement to the effect that the student did not know how to do the task. These responses were not rated.

Levels of Task Accomplishment

Level 4

Elaborated

Students providing elaborated responses went beyond the essential, reflecting a higher level of coherence and providing more detail to support the points made.

Level 3

Adequate

Students providing adequate responses included the information and ideas necessary to accomplish the task and were considered likely to be effective in achieving the desired purpose.

Level 2

Minimal

Students writing at the minimal level recognized some or all of the elements needed to complete the task but did not manage these elements well enough to assure that the purpose of the task could be achieved.

Level 1

Unsatisfactory

Students who wrote papers judged as unsatisfactory provided very abbreviated, circular, or disjointed responses that did not begin to address the writing task.

Level 0

Not rated

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[1] Lloyd-Jones, R. (1977). Primary trait scoring. In C. R. Cooper & L. Odell (Eds.), *Evaluating writing: Describing, measuring, judging.* Urbana, IL: National Council of Teachers of English.

The scoring criteria for evaluating levels of task accomplishment are designed to reflect the constraints inherent in a large-scale assessment situation. That is, students writing in an assessment context have limited time to think about, plan, and draft their piece; they have no access to various reference materials and they do not have an opportunity to obtain feedback from others or to revise their work. Therefore, the writing samples produced by students in the assessment were viewed as representative of their ability to produce first-draft writing, not final and polished pieces. Because primary trait scoring is based on established criteria, it is theoretically possible for all papers to be rated at the highest level on a straightforward task.

The long-term trend writing assessment is separate from the "main" NAEP writing assessment conducted at grades 4, 8, and 12 in 1992. The results of the main 1992 writing assessment are presented in *NAEP 1992 Writing Report Card.*[5] The 1992 assessment consisted of entirely different writing tasks and gave students almost twice as much time to respond. At the eighth and twelfth grades, several 50-minute tasks were administered. Students were given a planning page in order to make notes and sketch out their ideas. New scoring criteria were also developed to meet the expanded and more demanding nature of the tasks. Six levels of task accomplishment were defined and employed to classify and evaluate students' responses. Further, the main NAEP writing assessment conducted in 1992 was administered in the spring to grades 4, 8, and 12, while the trend assessment is administered in the fall at grade 8, the winter at grade 4, and the spring at grade 11. Thus, differences between the long-term trend assessment and the separate assessment conducted in 1992 preclude direct comparisons between the two assessments.

A new writing assessment is planned for 1998 that is also distinct from the long-term trend assessment in writing as well as the main assessment conducted in 1992. This new assessment (while based on the same framework used in 1992) contains a substantially increased number of writing tasks and a wider variety of stimuli, and uses scoring criteria that focus on a combination of primary trait, holistic, and mechanics elements. The newer NAEP writing assessment planned for 1998 will be administered to state samples of eighth graders, as well as to national samples of fourth, eighth, and twelfth graders.

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[5] Applebee, A. N., Langer, J. A., Mullis, I. V. S., Latham, A. S., & Gentile, C. A. (1994). *NAEP 1992 writing report card.* National Center for Education Statistics. Washington, DC: U. S. Government Printing Office.

Analysis Procedures

To analyze trends in students' writing performance, the primary trait results across the writing tasks were aggregated using item response theory (IRT) scaling techniques that account for the multilevel rating system used to evaluate student responses to the individual tasks. The resulting scale, which ranges from 0 to 500, allows for comparisons of average scores across assessments, age groups, and demographic subgroups. To provide a context for interpreting the overall trend results, an additional analysis was performed to *map* the tasks used in the assessment onto the writing scale. The result of this mapping procedure is a profile of students' performance at various points on the NAEP scale. (For more detailed information on the analysis procedures and definitions of subgroups, see the Procedural Appendix).

NAEP reports the performance of groups and subgroups of students, not individuals. The measures of achievement included in this report are the average performance of groups of students on the NAEP writing scale and the percentages of students attaining successive levels of performance on the scale. Because the average scale scores and the percentages presented in this report are based on samples, they are necessarily estimates. Like all estimates based on surveys, they are subject to sampling as well as measurement error. To compute standard errors, NAEP uses a complex procedure that estimates the sampling error and other random error associated with observed assessment results.

In the tables and figures that present trend writing results, the 1996 assessment was statistically compared to two previous assessments: the prior assessment in 1994, and the first assessment in 1984 (i.e., the base year). The purpose of year-to-year statistical tests was to determine whether the results in the 1996 assessment were different from the results of the previous assessment or whether any changes had taken place since the base year assessment. Tests of other year-to-year comparisons can be found in previous reports of NAEP long-term trend assessments.

In addition to comparisons between individual assessment years, a second test of significance was conducted to detect statistically significant linear and quadratic trends across assessments. (See Procedural Appendix for a discussion of the procedure.) This type of analysis makes it possible to discuss statistically significant patterns that may be missed by year-to-year comparisons. For example, from assessment to assessment, students' average scale scores may consistently increase (or decrease) by a small amount. Although these small increases (or decreases) between years may not be statistically significant under pairwise multiple comparisons, the overall increasing (or decreasing) trend in average scores may be statistically significant and noteworthy. The purpose of trend tests is to determine whether the results of the series of assessments could be generally characterized by a line or a simple curve. A linear trend test for cumulative change over the entire assessment period, such as an increase or decrease at a relatively constant rate. Simple curvilinear (i.e., quadratic) relationships represent more complex patterns. Two examples of such patterns include initial score declines over part of the time period followed by subsequent increases in more recent assessments, or a pattern of initial score increases over a time period followed by a period of relatively stable performance.

This Section

The two chapters in Part IV provide different perspectives on students' writing achievement. Chapter 7 presents average writing scale scores and describes changes in the performance of fourth, eighth, and eleventh graders across the six writing trend assessments conducted by NAEP since 1984. Also in Chapter 7, levels of writing performance are defined, and trends in levels of writing performance from 1984 to 1996 are presented. Chapter 8 summarizes trends in students' responses to questions about their writing experiences and instruction and discusses relationships between these background factors and writing achievement.

In Chapter 7, the results of statistical tests conducted to determine significant differences between 1996 and the first assessment year, and between 1996 and 1994, are indicated in grids that appear next to or below the figures and tables. The results from tests comparing the base year and 1996 assessments are summarized in the column labeled with the asterisk symbol "*." Significant differences are denoted with a "+" or "-" sign indicated that the 1996 average score was either greater than or less than the base year score, respectively. Similarly, significant differences between 1994 and 1996 assessment results are denoted with a "+" or "-" sign under the column labeled with the dagger symbol "‡" indicating that the 1996 average score was either greater or smaller than the 1994 average, respectively. The results from the linear and quadratic trend tests are summarized in the column labeled "L" and "Q," respectively. Within each column, significant positive trends are denoted by a "+" sign and significant negative trends are denoted with a "-" sign. In Chapter 8, where only the first and most recent assessment results are presented, significant differences between the base year and 1996 are indicted within the tables. All of the differences and trend patterns discussed in this report are statistically significant at the .05 level.

Chapter 7

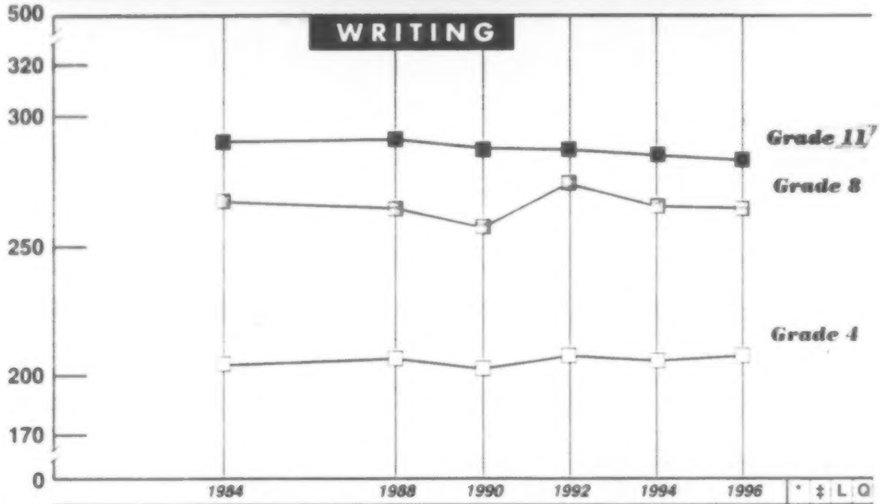
Writing Scores for the Nation and Selected Subpopulations

Results for the Nation from 1984 to 1996

NAEP conducted trend writing assessments in 1984, 1988, 1990, 1992, 1994, and 1996. Nationally representative samples of fourth, eighth, and eleventh graders participated in each trend assessment and were administered the same set of writing tasks, with some tasks administered at two grade levels.

Figure 7.1 presents trend results in writing for the nation from 1984 to 1996.

Figure 7.1 Trends in Average Writing Scale Scores for the Nation, 1984 to 1996



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	290(1.6)	291(1.3)	287(1.0)	287(1.4)	285(1.2)	283(1.2)	–		–	
Grade 8	267(2.0)	264(1.3)	257(1.2)	274(1.3)	265(1.3)	264(1.0)				
Grade 4	204(1.5)	206(1.6)	202(1.5)	207(1.5)	205(1.6)	207(1.2)				

Standard errors of the estimated scale scores appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Eleventh Grade. The average writing score of eleventh graders has shown an overall pattern of decrease across the assessment years. Although the average score in 1996 did not differ significantly from that attained in the 1994 assessment, it was lower than the 1984 average.

Eighth Grade. The average writing scale score of eighth graders has fluctuated across the six assessments, reaching a low point in 1990 and rebounding in 1992. However, trend analyses revealed no consistent pattern of increases or decreases across the assessment years. In 1996 the average score was not significantly different from the 1984 or 1994 averages.[6]

Fourth Grade. The average writing scale score of fourth graders has varied little across the six assessments. From 1984 to 1996, no significant changes in fourth graders' performance were observed, and there was no significant change since 1994.

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[6] The magnitude of the increase at grade 8 in 1992 for such a large national sample was unusual. To ensure that this increase reflected an actual change in student performance, ETS reviewed and evaluated all of its administration, scoring, and analysis procedures. The administration procedures were the same as in previous years — the same materials were given to eighth graders at the same time of year as in previous trend years. The eighth graders' writing was scored at the same time of year as in previous trend assessments and the same scoring guides and papers were used. Rigorous quality control measures were then employed to examine the data analysis procedures and no inconsistencies were found. For more detailed information see Carlson, J. & Johnson, E. (1994). Grade 8 writing trend: Investigation of the changes in mean proficiency between 1988 and 1990 and between 1990 and 1992. In E.G. Johnson, and J.E. Carlson, *The NAEP 1992 Technical Report.* National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

National Trends in Levels of Writing Performance from 1984 to 1996

To provide a context for interpreting the overall writing trend assessment results, the tasks administered in the assessment were *mapped* onto the writing scale.[7] Item mapping is an alternative to the scale anchoring procedure conducted for the science, mathematics, and reading trend assessments. Because the anchoring procedure requires sets of items to define each anchor level, this approach was not appropriate for the writing assessment due to the small number of tasks.

Typically, to map an assessment item is to identify the point on the scale at which individuals with that level of performance had a high probability of responding correctly to the item. Because the NAEP writing assessment is a direct measure of students' writing abilities, however, it does not contain items that can be scored as correct or incorrect. Instead, students' responses to the writing tasks are rated as being at one of four levels of task performance described in the scoring guide (Unsatisfactory, Minimal, Adequate, and Elaborated). Thus, instead of mapping an individual item at a point on the scale at which students were likely to provide a "correct" answer, the item mapping technique was modified to map the rating levels for each writing task onto the scale.

For each rating category on each task, the point on the 0-to-500 scale was identified at which individuals performing at that level had a 65 percent probability of writing a response with that rating or higher. At grade 4 for instance, the persuasive task asking students to write a letter stating their view about whether creatures from another planet should be allowed to return home or be detained for scientific study (spaceship task) mapped at level 200 for the rating minimal or better. This means that there is a .65 probability that students at Level 200 would write minimal or better responses to this task. (More detailed information about item mapping and scaling procedures can be found in the Procedural Appendix.)

The results of the item mapping for the writing assessment are displayed in Figure 7.2. In this figure, the grade 4, 8, and 11 results are presented separately along the writing scale. The names of the various tasks are followed by the term "informative" or "persuasive," indicating the nature of the task; the minimum level of task accomplishment which mapped at that point on the scale is indicated under each task's name. (See the figure on page 146 for a description of each writing task and the figure on 147 for a description of the ratings for each task.) It should be noted that the percentage of students whose responses were rated as "Elaborated" was so small that – mapping of tasks for the "Elaborated" category was statistically unreliable.

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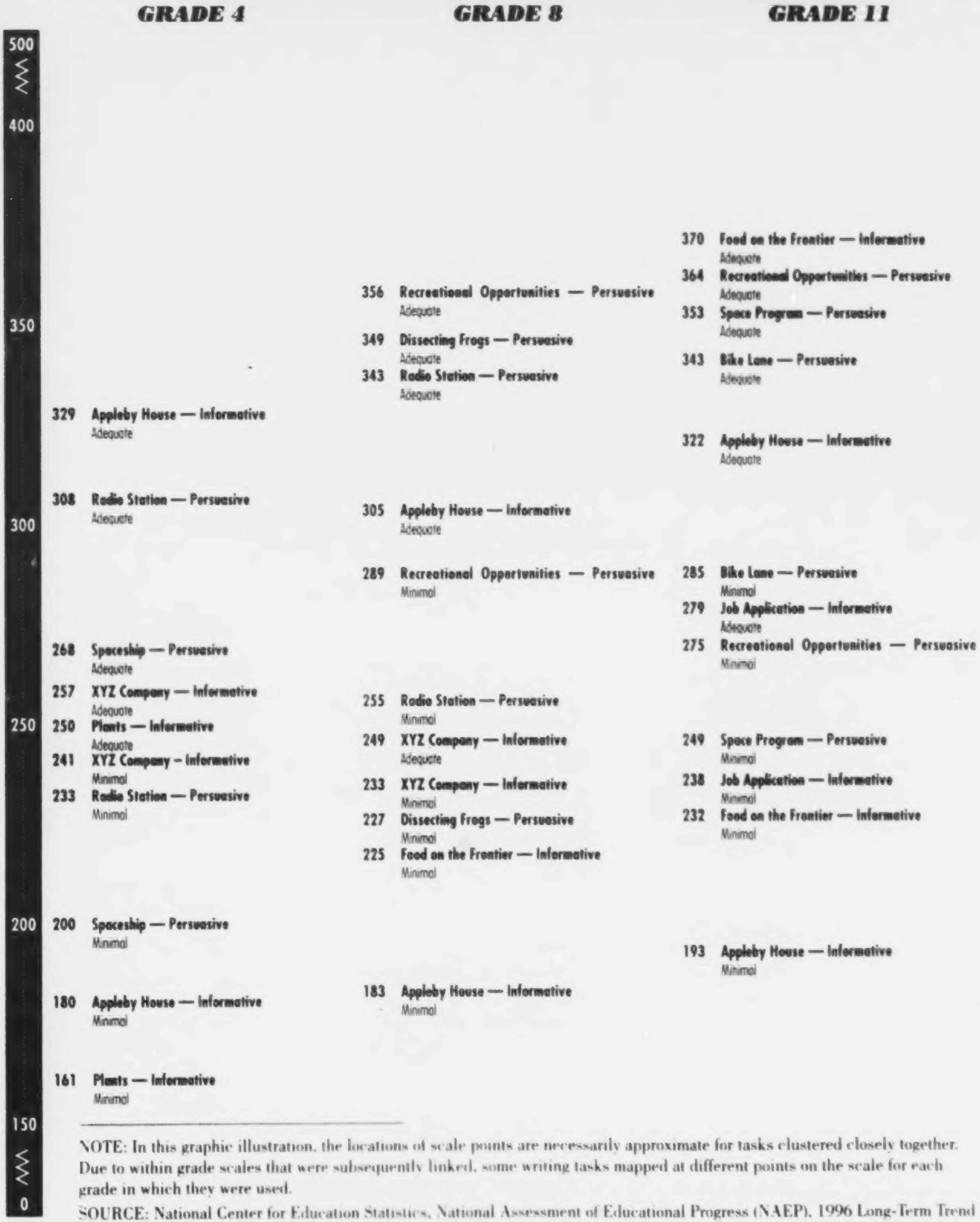
[7] This technique is an adaptation of a method developed to report the results of NAEP's 1985 literacy assessment of young adults. For more information see Kirsch, I. S., & Jungeblut, A. (1986). *Literacy profiles of America's young adults.* Princeton, NJ: Educational Testing Service. Also, see the Procedural Appendix of this report for a description of the mapping procedure.

Figure 7.2 Difficulty Values Along the Writing Scale for the Different Levels of Performance on the Informative and Persuasive Tasks, Grades 4, 8, and 11, 1996



NOTE: In this graphic illustration, the locations of scale points are necessarily approximate for tasks clustered closely together. Due to within grade scales that were subsequently linked, some writing tasks mapped at different points on the scale for each grade in which they were used.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table 7.1 presents the percentages of students performing at or above five scale levels (150, 200, 250, 300, and 350).[8] These percentages can be used in conjunction with the item mapping information to provide a portrait of the performance of students at each grade. As an example of how to interpret the information presented in Figure 7.2 and Table 7.1, examine the performance of fourth graders at or above Level 250. It is evident that fourth graders who reached Level 250 represented some of the best writers at that grade, since only 1 percent of their peers attained the next highest level, Level 300. To illustrate the types of writing abilities demonstrated by students who reached at least Level 250, refer to Figure 7.2. Fourth graders estimated to be at or above Level 250 on the writing scale were likely to provide adequate or better responses to the Plants task an informative writing task. (Performance level data are available by gender, race/ethnicity, modal age, region, parents' education level, type of school, and quartiles in the Data Appendix.)

Table 7.1

Trends in Percentage of Students At or Above Five Writing Performance Levels, 1984 to 1996

		Assessment Years									
Performance Levels	**Grade**	**1984**	**1988**	**1990**	**1992**	**1994**	**1996**	*****	**‡**	**L**	**Q**
Level 350 **Effective, Coherent Writing**	4	0 (***)	0 (***)	0 (***)	0 (***)	0 (***)	0 (***)				
	8	0 (***)	0 (0.1)	1 (0.2)	2 (0.3)	1 (0.2)	1 (0.2)				–
	11	2 (0.7)	1 (0.4)	4 (0.7)	2 (0.4)	3 (0.3)	2 (0.5)				
Level 300 **Complete, Sufficient Writing**	4	1 (***)	1 (0.2)	1 (0.1)	1 (0.2)	0 (0.2)	1 (0.2)				
	8	13 (1.8)	13 (0.8)	12 (0.8)	25 (1.5)	17 (1.2)	16 (0.8)			+	
	11	39 (2.4)	39 (1.7)	37 (1.1)	36 (1.9)	33 (1.5)	31 (1.5)	–		–	
Level 250 **Beginning Focused, Clear Writing**	4	10 (1.0)	15 (1.1)	12 (0.9)	13 (1.1)	12 (0.8)	13 (1.2)				
	8	72 (2.6)	67 (1.7)	57 (1.5)	75 (1.4)	67 (1.3)	66 (1.3)	–			+
	11	89 (1.0)	93 (1.5)	84 (1.3)	87 (1.3)	85 (1.2)	83 (1.4)	–		–	
Level 200 **Incomplete, Vague Writing**	4	54 (2.0)	56 (2.0)	53 (1.7)	58 (1.9)	56 (2.0)	59 (1.5)				
	8	98 (0.9)	97 (0.6)	93 (0.6)	98 (0.4)	96 (0.6)	96 (0.5)	–		–	
	11	100 (0.3)	100 (***)	99 (0.3)	100 (0.2)	99 (0.2)	99 (0.2)				
Level 150 **Disjointed, Unclear Writing**	4	93 (1.3)	91 (0.8)	89 (1.1)	93 (0.5)	92 (0.9)	93 (0.7)				+
	8	100 (***)	100 (***)	100 (0.1)	100 (***)	100 (***)	100 (0.1)				
	11	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)	100 (***)				

Standard errors of the estimated percentages appear in parentheses. When no standard error appears (***), standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions. In these cases statistical tests have not been conducted. (See Procedural Appendix.)

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[8] The performance levels are based upon a vertical scale that assumes writing ability is cumulative. Younger students are not expected to perform at the same level as older students. Therefore, most 9-year-olds are not expected to reach upper levels of performance.
In theory, performance levels above 350 and below 150 could have been defined; however, so few students in the assessment performed at the extreme ends of the writing scale that it was not practical to do so.

Level 350. Students performing at this level demonstrated effective, coherent writing. They tended to write responses that were rated as Adequate for even the more difficult persuasive tasks. The writing at this level represented clear and complete responses to the assigned task. It tended to contain supportive details and discussion that contributed to the effectiveness of the response. This writing was also characterized by an overall unity and coherence not found at lower levels. As shown in Figure 7.1, very few students achieved this level of performance in any of the trend writing assessments. In 1996, none of the fourth graders and almost none of the eighth and eleventh graders, 1 percent and 2 percent, respectively reached this level.

Level 300. Responses at this level tended to be complete and contained sufficient information to accomplish the task. Students performing at this level were likely to write responses that were rated as Adequate for some of the tasks. Almost none of the fourth graders reached this level across the assessments. At grade 8, there was a trend toward greater percentages of students reaching at least Level 300 across the assessment years. However, the percentage in 1996 was not significantly different from that in 1984. Among eleventh graders, the trend was toward fewer students reaching at least this level of performance. In 1996, the percentage of eleventh-grade students performing at or above Level 300 was smaller than that in 1984.

Level 250. At this level of performance, students were beginning to demonstrate focused, clear writing. At grades 8 and 11, if the task involved persuading an audience, students at Level 250 tended not to provide an argument considered adequate to convince the intended audience. No significant change across the trend assessments was observed in the percentages of fourth graders attaining at least this level of performance. In 1996, 13 percent of fourth-grade students performed at or above Level 250. Among eighth graders, although the percentage of students at or above this level has increased since the low point in 1990, the percentage in 1996 was lower than that in 1984. At grade 11, the trend across assessment years was toward fewer students attaining at least this level of performance. The percentage of eleventh graders at or above Level 250 in 1996 was lower than that in 1984.

Level 200. Students performing at Level 200 tended to write incomplete, vague responses for the writing tasks. Slightly more than half of the fourth graders performed at or above this level in each of the trend assessments. There was no significant change across the assessment years in the percentage of fourth graders reaching at least Level 200. In 1996, most eighth and eleventh graders performed at or above Level 200 — 96 percent and 99 percent, respectively. However, for eighth graders there was a slight decrease across the assessment years, and the 1996 percentage of students at or above this level was smaller than that in 1984.

Level 150. Students performing at this level tended to write responses that received unsatisfactory ratings for most of the tasks. Student writing that was rated as Unsatisfactory tended to be too brief and disjointed to be considered a response to the task or was so vague and unclear that it was difficult to understand. Nearly all eighth and eleventh graders (100 percent), and the vast majority of fourth graders performed at or above this level in each of the assessment years. At grade 4, the percentage of students demonstrating at least this level of performance declined between 1984 and 1990, but rebounded after that time so that the 1996 percentage did not differ significantly from that in 1984.

Trends in Writing Scale Scores by Quartile from 1984 to 1996

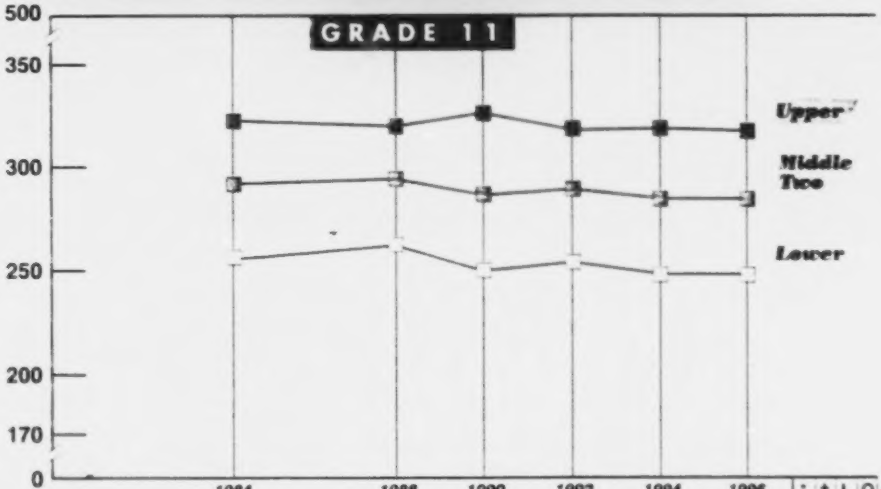
Figure 7.3 presents average writing scale scores for fourth-, eighth-, and eleventh-grade students who were in the upper quartile (upper 25 percent), the middle two quartiles (middle 50 percent), and the lower quartile (lower 25 percent) of student performance in each assessment. These data indicate performance trends for students who scored at different points along the distribution, thus illustrating how particular groups performed overall in relation to their peers. As reflected by the data in Figure 7.3, varied patterns of change were observed for the three grades across the performance distribution; however, the quartile results mostly parallel results observed for the nation.

Despite some fluctuation, the average score of eleventh graders in the upper quartile has not changed significantly since 1984. Eleventh graders in the middle two and lower quartiles demonstrated an overall pattern of decreased performance. In 1996, the average score for eleventh graders in the middle two quartiles was lower than the 1984 average. While an overall pattern of decline was also evident in the lowest quartile, the 1996 average score was not significantly lower than the 1984 average for this group.

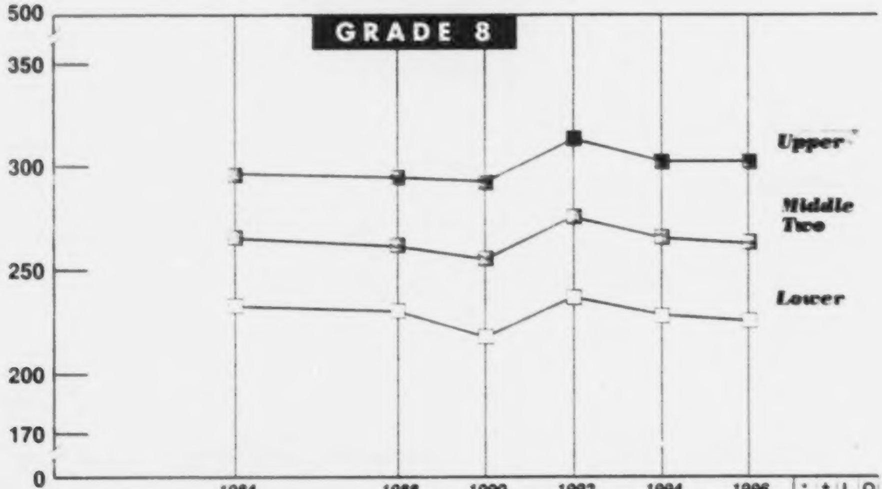
For eighth graders in the upper quartile, an overall pattern of increased performance was observed across the assessment years; however, the 1996 score was not significantly different from the 1984 average score. The pattern of performance for eighth graders in the middle two and lower quartiles was similar to that of the nation: average scores have fluctuated, but no consistent pattern of increases or decreases was observed, and the 1996 average scores were not significantly different from the 1984 averages.

Despite some fluctuations, the average writing scale score for fourth graders in the upper, middle two, and lower quartiles remained relatively constant. No significant changes in performance since 1984 were observed.

Figure 7.3 Trends in Average Writing Scale Scores by Quartile, 1984 to 1996



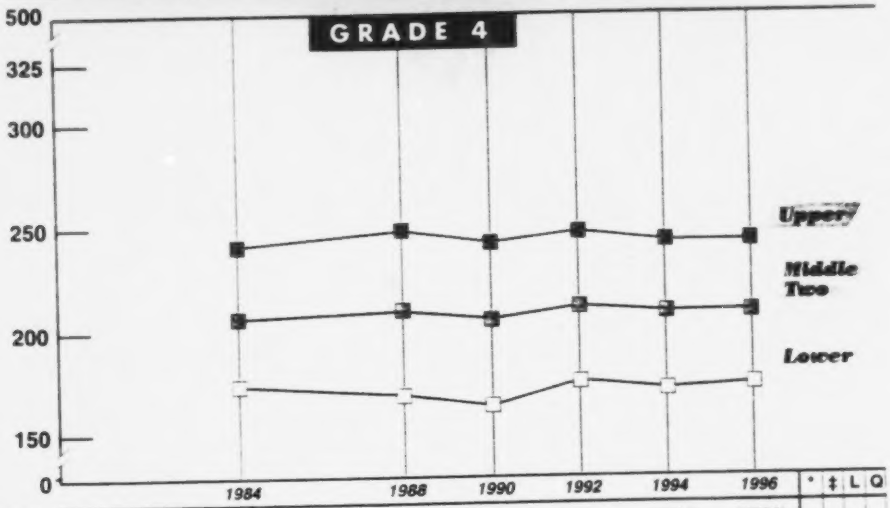
	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	322(1.9)	320(1.0)	325(1.6)	319(2.0)	319(1.3)	318(1.5)				
Middle Two	291(1.2)	293(1.2)	287(0.8)	289(1.1)	285(1.1)	285(0.9)	–		–	
Lower Quartile	255(2.0)	260(2.4)	250(2.1)	253(1.5)	249(1.8)	249(1.3)			–	



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	297(1.4)	296(1.3)	294(1.1)	311(1.0)	301(1.4)	301(1.5)			+	
Middle Two	268(2.4)	265(1.0)	257(1.0)	275(1.4)	267(1.3)	266(0.9)				
Lower Quartile	233(3.2)	231(1.8)	219(1.5)	237(2.1)	227(1.8)	226(1.2)				

Figure 7.3
(continued)

Trends in Average Writing Scale Scores by Quartile, 1984 to 1996



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Upper Quartile	241(2.3)	247(1.7)	242(1.6)	246(1.3)	242(1.3)	242(2.1)				
Middle Two	204(1.4)	207(1.5)	203(1.5)	208(1.7)	206(1.2)	206(1.1)				
Lower Quartile	166(2.6)	162(1.8)	158(2.4)	167(1.4)	164(2.7)	166(1.8)				

Standard errors of the estimated scale scores appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Writing Scale Scores by Race/Ethnicity from 1984 to 1996

Trends in average writing scale scores for White, Black, and Hispanic students are presented in Figure 7.4.

White Students. Eleventh-grade White students demonstrated an overall pattern of decreased performance across assessments; the average score in 1996 was lower than the 1984 average. The scores of White eighth graders fluctuated across the assessment years, similar to the pattern observed for the nation. However, the 1996 average score was not significantly different from that in 1984. No significant changes across the assessments were observed in the performance of White fourth graders.

Black Students. At the eleventh grade, the performance of Black students displayed no significant changes across the assessment years. The average score of Black eighth graders displayed a pattern of fluctuation similar to that observed for the nation, but there was no significant difference between average scores in 1984 and 1996. Like their White peers, fourth-grade Black students displayed no significant change in writing performance across the assessment years. Although the average score increased 9 points between 1994 and 1996, it was not a statistically significant change.

Hispanic Students. Among eleventh-grade Hispanic students, a pattern of increased performance from 1984 to 1990 was followed by a period of decline, resulting in a 1996 average score that did not differ significantly from that in 1984. As with other groups of eighth graders, the average scores of Hispanic students fluctuated over time, but the 1996 average score did not differ significantly from the 1984 average. The writing performance of Hispanic fourth graders showed no consistent pattern of increases or decreases from the first to the most recent assessment.

Figure 7.4 Trends in Average Writing Scale Scores by Race/Ethnicity, 1984 to 1996

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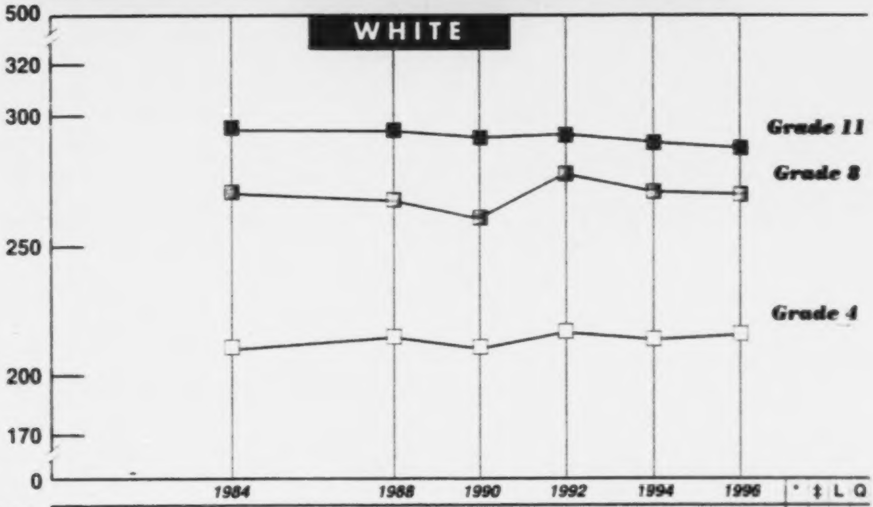
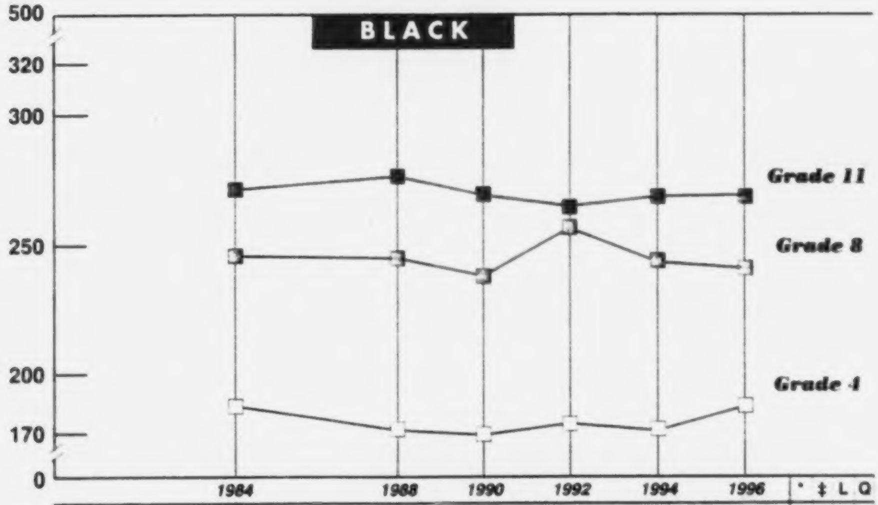


	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	297(1.8) 75(1.1)	296(1.3) 74(0.1)	293(1.2) 71(0.2)	294(1.2) 71(0.2)	291(1.4) 68(0.3)	289(1.5) 68(0.3)	–		–	
Grade 8	272(2.1) 76(0.9)	269(1.3) 71(0.2)	262(1.6) 70(0.2)	279(1.3) 70(0.3)	272(1.4) 70(0.2)	271(1.0) 69(0.3)				
Grade 4	211(1.9) 71(1.0)	215(1.9) 70(0.3)	211(2.0) 70(0.3)	217(1.7) 71(0.3)	214(1.5) 69(0.4)	216(1.6) 68(0.5)				



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	270(3.6) 15(1.0)	275(2.9) 15(0.1)	268(2.3) 16(0.2)	263(3.2) 14(0.2)	267(2.2) 15(0.2)	267(3.0) 15(0.2)				
Grade 8	247(5.7) 12(0.6)	246(3.5) 15(0.2)	239(2.3) 15(0.2)	258(4.0) 16(0.1)	245(3.4) 15(0.2)	242(2.6) 14(0.2)				
Grade 4	182(5.0) 15(0.9)	173(4.7) 16(0.2)	171(5.4) 15(0.3)	175(3.8) 16(0.2)	173(3.2) 15(0.3)	182(2.3) 15(0.4)				

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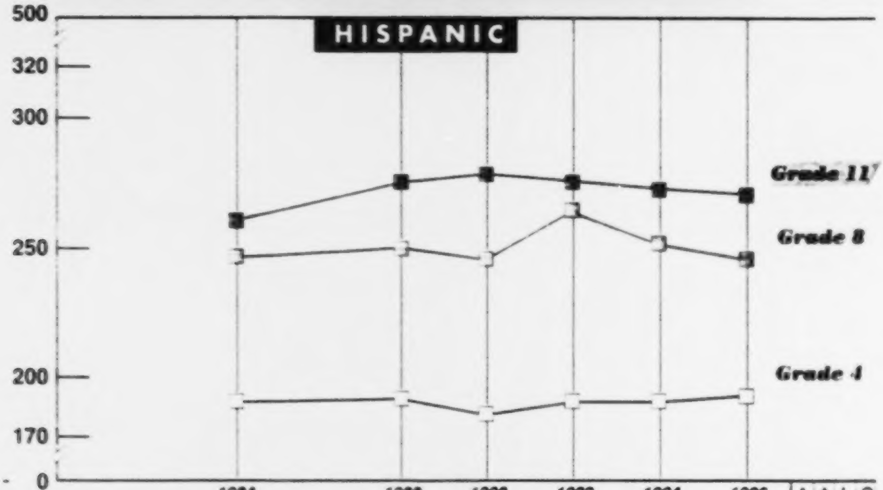
Figure 7.4
(continued)

Trends in Average Writing Scale Scores by Race/Ethnicity, 1984 to 1996



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	259(6.6) 8(0.6)	274(4.4) 8(0.1)	277(2.6) 9(0.1)	274(3.8) 11(0.2)	271(4.0) 12(0.2)	269(2.5) 12(0.2)				–
Grade 8	247(6.4) 8(0.7)	250(2.5) 10(0.1)	246(2.8) 10(0.2)	265(2.2) 10(0.2)	252(3.3) 11(0.2)	246(2.3) 12(0.2)				
Grade 4	189(5.8) 11(0.7)	190(3.5) 11(0.3)	184(4.1) 11(0.2)	189(3.6) 10(0.2)	189(3.1) 12(0.3)	191(3.2) 13(0.4)				

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Writing Scale Scores by Gender from 1984 to 1996

Figure 7.5 presents trends in the average writing scale score for male and female students.

Male Students. Eleventh-grade male students displayed an overall pattern of decreased performance across the assessments, resulting in a lower average score in 1996 than in 1984. For eighth-grade male students, scores fluctuated over time, and the 1996 average score was lower than the 1984 average. Among male students, fourth graders' performance displayed no significant change across the assessment years.

Female Students. Among eleventh-grade females, an overall pattern of decreased performance was observed; however, the average score in 1996 did not differ significantly from the 1984 average. Despite some fluctuations, female eighth graders' performance did not vary significantly between 1984 and 1996. As with their male peers, female fourth graders displayed no significant change from the first to the most recent assessment.

Figure 7.5 Trends in Average Writing Scale Scores by Gender, 1984 to 1996

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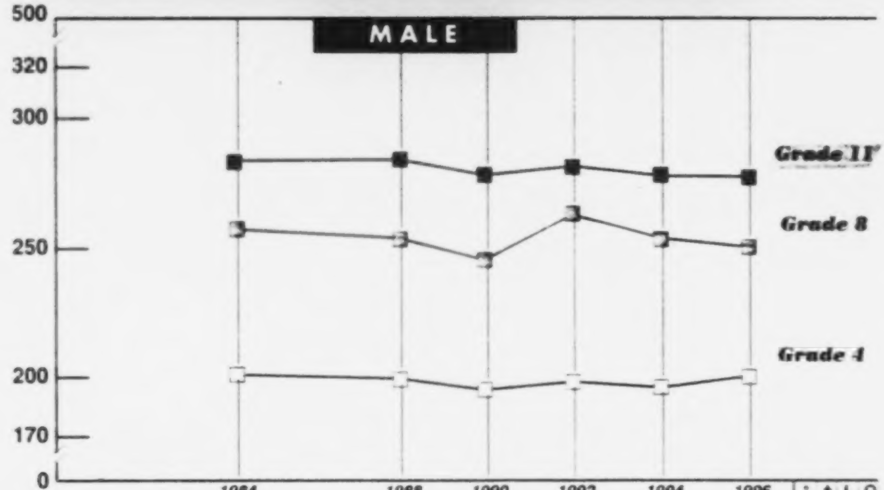
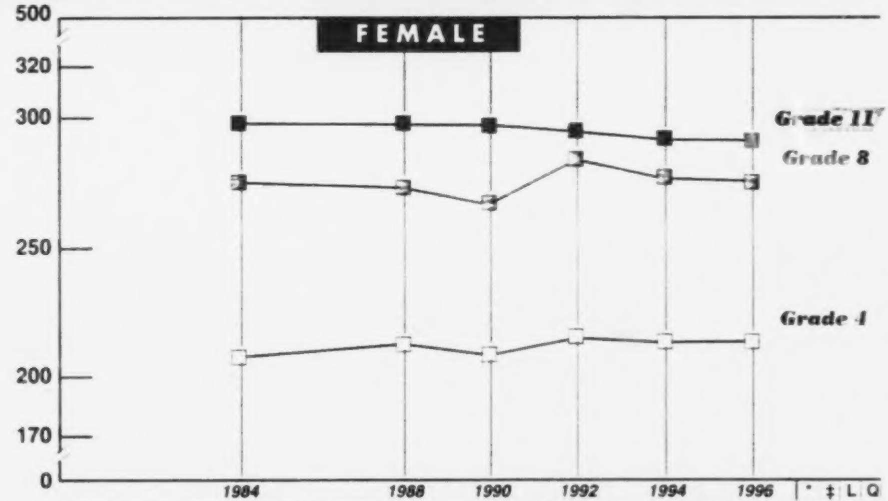


	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	281(1.4) 51(1.6)	282(2.0) 47(1.5)	276(1.6) 51(0.8)	279(1.2) 53(1.1)	276(1.5) 49(1.7)	275(1.4) 52(0.9)	–		–	
Grade 8	258(2.3) 51(1.2)	254(1.5) 49(1.1)	246(1.5) 51(0.9)	264(1.9) 50(0.8)	254(1.8) 52(0.9)	251(1.1) 50(1.0)	–			
Grade 4	201(2.8) 53(1.7)	199(2.3) 50(1.0)	195(1.9) 51(1.0)	198(1.7) 50(0.6)	196(1.7) 50(0.9)	200(1.8) 50(0.8)				



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	299(2.5) 49(1.6)	299(1.2) 53(1.5)	298(1.5) 49(0.8)	296(2.0) 47(1.1)	293(1.5) 52(1.7)	292(1.4) 48(0.9)			–	
Grade 8	276(2.4) 49(1.2)	274(1.7) 51(1.1)	268(1.3) 50(0.9)	285(1.3) 51(0.8)	278(1.4) 48(0.9)	276(1.2) 50(1.0)				
Grade 4	208(3.1) 47(1.7)	213(2.0) 50(1.0)	209(2.2) 49(1.0)	216(1.7) 50(0.6)	214(2.2) 50(0.9)	214(1.9) 50(0.8)				

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Differences in Average Writing Scale Scores by Race/Ethnicity and Gender

In addition to the trends in writing achievement for racial/ethnic and gender subgroups as discussed in the previous section, trend analyses also provide information about the performance differences between these subgroups. Trends in score differences indicate whether the achievement gaps between racial/ethnic and gender subgroups are increasing, decreasing, or remaining relatively the same over time. As with past NAEP assessments, significant differences between racial/ethnic subgroups and between males and females continued to be evident in the 1996 writing assessment.

A considerable amount of research and discussion has focused on the achievement differences between subpopulations that are consistently documented in the NAEP trend assessments and other studies. Many researchers suggest that the limited educational opportunities afforded to many minority students may account for at least part of the achievement discrepancy between racial/ethnic subgroups of students.[9]

These factors are consistent with other research that has used NAEP results to explore differences in performance between racial groups.[10] Recent arguments demonstrate that reporting unadjusted differences among racial groups may be misleading since these groups come from different family, school, and community contexts that are related to achievement. When achievement results are controlled for social context, test score differences between groups may be reduced.[11] Other research shows that while a substantial performance gap still exists, the performance difference between non-Hispanic White 13- and 17-year-olds and their Hispanic and Black peers has narrowed between 1975 and 1990. Gains among Black and Hispanic students, however, could not be explained by changing family characteristics (parental education level, family size, family income) alone.[12] Gender differences in the language arts subject areas, such as writing, have also been viewed by some as a product of cultural and educational practices that result in differing expectations for achievement between male and female students.[13] As these issues remain in the forefront of educational planning and curriculum development, the NAEP trend assessments in writing continue to document subgroup differences in performance.

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[9] MacIver, D. J., & Epstein, J. L. (1990). *How equal are opportunities for learning in disadvantaged and advantaged middle grade schools?* (Report No. 7). Center for Research on Effective Schooling for Disadvantaged Students. Baltimore, MD: Johns Hopkins University.

Stevens, F. (1993). *Opportunity to learn: Issues of equity for poor and minority students.* Washington, DC: National Center for Education Statistics.

[10] Berends, M., & Koretz, D. M. (1995). Reporting minority students' test scores: How well can the National Assessment of Educational Progress account for differences in social context? *Educational Assessment, 3*(3), 249-285.

Jaynes, G. D., & Williams, R. M. Jr. (Eds.). (1989). *A common destiny: Blacks and American society.* Washington, DC: National Academy Press.

Grissmer, D. W., Kirby, S. N., Berends, M., & Williamson, S. (1994). *Student achievement and the changing American family.* Santa Monica, CA: Rand.

[11] Berends, M., & Koretz, D. M. op. cit.

[12] Grissmer, D. W., et. al., op. cit.

[13] Cummings, R. (1994). 11th graders view gender differences in reading and math. *Journal of reading, 38* (3), 196-199.

Schick, R. (1992). *Social and linguistic sources of gender differences in writing composition.* Paper presented at the Annual Meeting of the National Reading Conference, San Antonio, TX.

Figure 7.6 presents trends since 1984 in average writing score differences between White and Black, White and Hispanic, and male and female students.

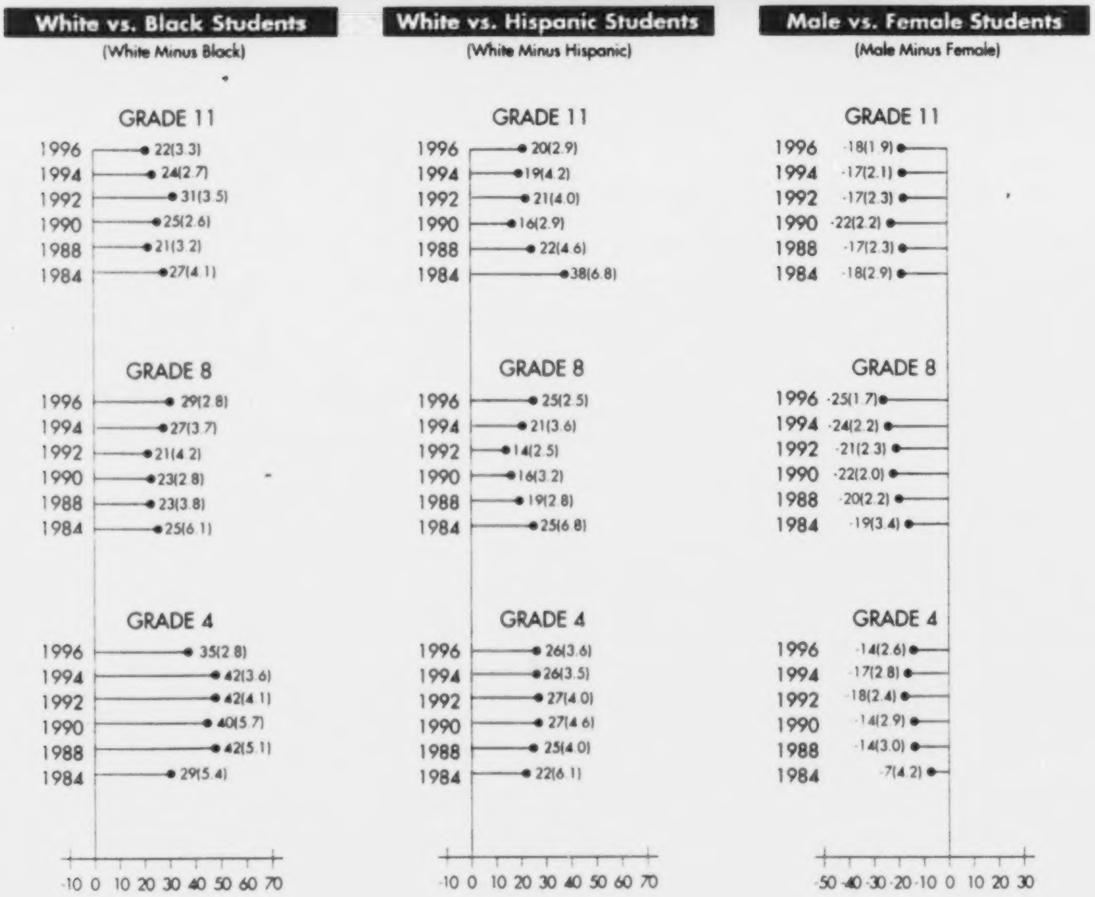
White-Black and White-Hispanic. At all three grades, White students in 1996 displayed higher average writing scores than did their Black and Hispanic peers. Across the assessment years, there has been no statistically significant change at any of the three grades in the scale score gap between White and Black students or between White and Hispanic students.

Male-Female. At each grade in 1996, female students outperformed male students in the writing assessment. No significant change was observed in the performance gap between males and females across the assessment years at any of the three grades.

205

Figure 7.6

Trends in Differences in Average Writing Scale Scores by Race/Ethnicity and Gender



White vs. Black Students (White Minus Black)

White vs. Hispanic Students (White Minus Hispanic)

Male vs. Female Students (Male Minus Female)

	*	‡	L	Q
Grade 11				
Grade 8				
Grade 4				

	*	‡	L	Q
Grade 11				
Grade 8				
Grade 4				

	*	‡	L	Q
Grade 11				
Grade 8				
Grade 4				

Standard errors of the estimated scale score differences appear in parentheses.

* Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the average scale score difference in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Writing Scale Scores by Region from 1984 to 1996

Figure 7.7 presents trends in average writing scale scores for students in the Northeast, Southeast, Central, and West regions of the country.

Northeast. In the Northeast, at grades 4 and 11, no significant changes in writing performance were observed between 1984 and 1996. Among eighth graders in the Northeast, average scores have fluctuated across the assessments in a manner similar to that observed in the national results. Although the average score for these students declined between 1994 and 1996, the 1996 average score remained at a level not significantly different than that in 1984.

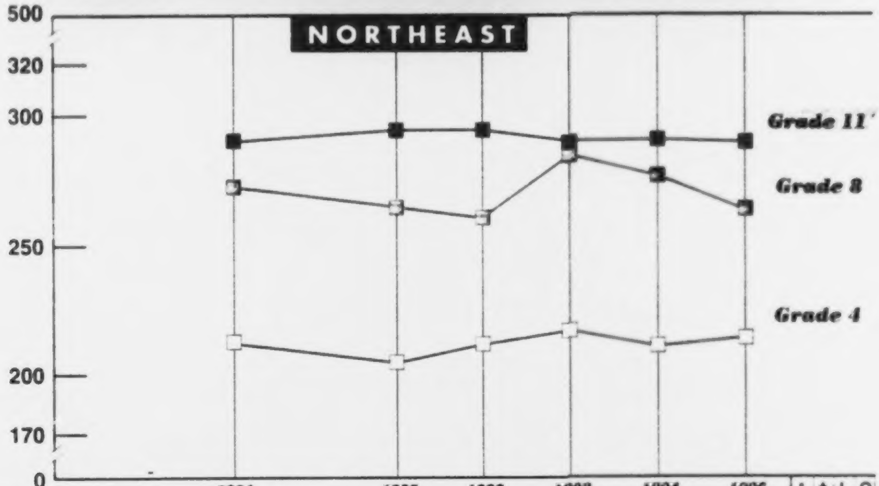
Southeast. For eleventh-grade students in the Southeast, the overall pattern was one of decreased performance; however, this overall trend did not result in a 1996 average score that was significantly lower than the average in 1984. In the Southeast, the average scores of fourth- and eighth-grade students in 1996 did not significantly differ from those in 1984.

Central. No significant change was observed for eleventh graders in the Central region. Both fourth and eighth graders demonstrated an overall pattern of increased performance across the assessment years; at grade 8, however, this did not result in a 1996 average score that differed significantly from the 1984 average. The 1996 average score for fourth graders was higher than that of their counterparts in 1984.

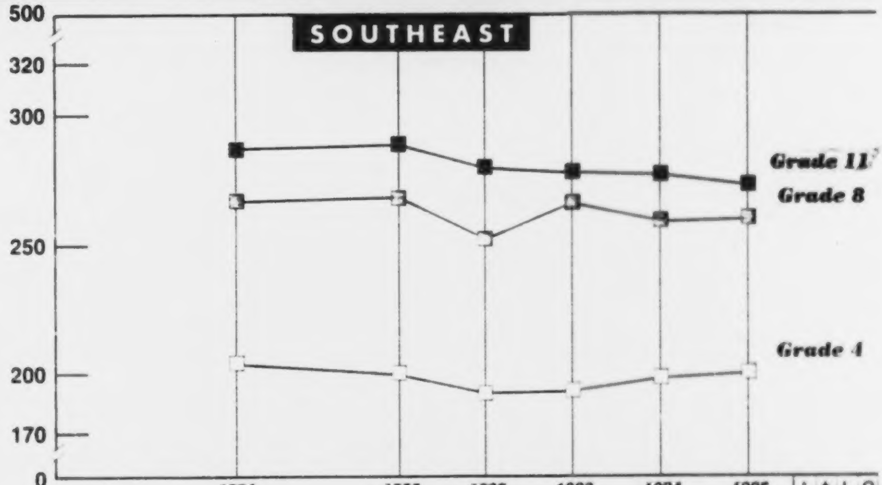
West. In the West, fourth-, eighth-, and eleventh-grade students demonstrated no consistent pattern of increases or decreases across the assessment years. At all three grades, the average scores of students in the West in 1996 did not differ significantly from the score of their counterparts in 1984.

A comparison of the 1996 average scores of students from different regions revealed that fourth graders in the Northeast outperformed their peers in the Southeast. Among eleventh graders, students in the Southeast had lower average scores than their peers in each of the other three regions.

Figure 7.7 Trends in Average Writing Scale Scores by Region, 1984 to 1996



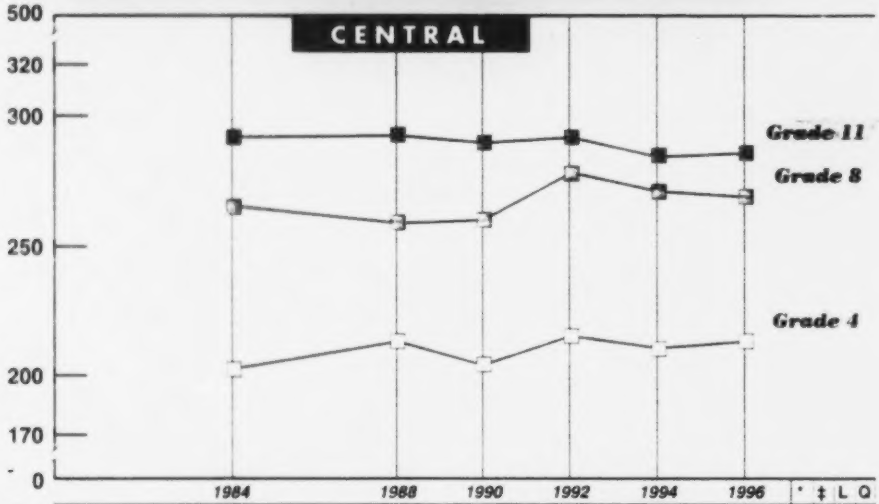
	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	291(3.0) 26(0.8)	295(2.8) 23(0.8)	295(2.5) 22(1.0)	290(2.3) 22(0.9)	291(2.4) 22(0.8)	290(2.2) 25(3.1)				
Grade 8	273(3.6) 23(1.0)	265(2.7) 23(2.2)	261(3.3) 23(1.0)	285(3.3) 21(1.0)	277(2.2) 21(0.7)	264(2.4) 22(2.0)		–		
Grade 4	212(4.0) 20(0.7)	204(4.9) 23(1.7)	211(3.6) 22(1.0)	216(4.0) 21(1.3)	210(4.0) 21(1.1)	213(2.8) 22(2.7)				



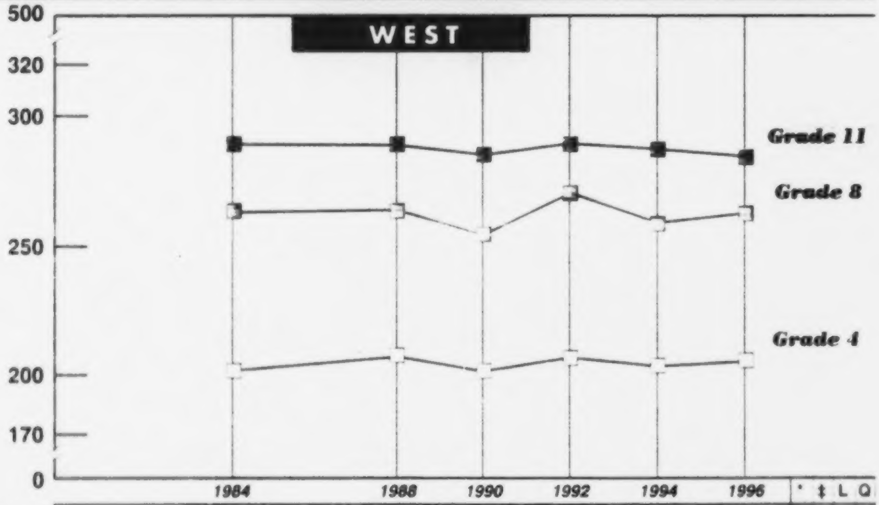
	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	287(4.9) 22(1.7)	289(2.2) 22(1.0)	280(2.3) 23(0.9)	278(3.3) 24(1.4)	277(2.5) 23(1.3)	273(2.2) 23(2.9)			–	
Grade 8	267(3.6) 23(1.7)	268(2.3) 24(1.3)	252(2.8) 25(1.1)	266(2.2) 25(1.5)	259(2.1) 23(1.8)	260(3.5) 25(2.5)				
Grade 4	204(3.3) 25(1.5)	200(2.3) 26(1.7)	192(4.0) 24(1.2)	193(2.4) 24(1.3)	198(3.4) 25(1.8)	200(3.4) 24(2.4)				

Figure 7.7
(continued)

Trends in Average Writing Scale Scores by Region, 1984 to 1996



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	291(2.7) 27(1.6)	292(4.0) 27(1.7)	289(2.7) 27(1.1)	291(2.2) 26(1.1)	284(2.3) 26(1.4)	285(2.5) 25(1.0)				
Grade 8	264(2.3) 27(1.6)	258(2.2) 26(2.2)	259(3.9) 23(0.7)	277(2.0) 25(1.0)	270(4.1) 26(1.6)	268(2.3) 23(0.9)			+	
Grade 4	201(2.6) 28(1.5)	212(3.0) 23(0.5)	203(3.1) 25(0.7)	214(3.1) 28(0.8)	209(3.3) 25(1.2)	212(3.1) 26(1.2)	+		+	



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	289(3.7) 25(0.8)	289(2.3) 28(1.1)	285(2.1) 28(0.9)	289(2.1) 29(1.0)	287(2.7) 29(1.0)	284(2.2) 28(2.3)				
Grade 8	264(3.0) 26(0.8)	264(2.1) 28(1.1)	255(2.6) 29(1.0)	271(2.3) 29(1.2)	259(1.6) 30(1.2)	263(1.3) 29(2.1)				
Grade 4	201(4.9) 27(0.9)	207(3.4) 28(1.1)	201(2.7) 29(0.8)	206(2.2) 28(0.7)	203(2.7) 29(1.0)	205(2.5) 29(2.0)				

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1984

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Writing Scale Scores by Parents' Highest Level of Education from 1984 to 1996

Figure 7.8 presents trends in average writing scale scores by students' reports of their parents' highest level of education. Across all three grades, a positive relationship existed between the highest level of education attained by either parent and students' writing achievement.

From 1984 to 1996, there was an increase in the percentage of students at each grade reporting that at least one parent had graduated from college; correspondingly, a decrease since 1984 was seen in the percentages of students who reported high school graduation or less than high school as their parents' highest level of education. It should be noted that across the trend assessments approximately one-third of fourth graders and one-tenth of eighth graders responded "I don't know" to the question about their parents' highest level education. Furthermore, some research has revealed the potential for young children to provide inaccurate reports about such information.[14]

Among eleventh graders, an overall pattern of decreased performance was observed for students reporting the three highest levels of parental education. For eleventh graders who reported that at least one of their parents had received some education after high school or had graduated from college, the 1996 average score was lower than the 1984 average score.

Although fluctuations were observed in the average scores of eighth-grade students at each level of parental education, no consistent pattern of increases or decreases across the assessment years was revealed in the trend analyses. Furthermore, the average scores in 1996 for students reporting each parental education level were not significantly different from that of their counterparts in 1984.

Fourth-grade students who reported that high school graduation was the highest level of parental education displayed an overall pattern of improved performance across the assessments resulting in a 1996 average score that was higher than the 1984 average. The performance of fourth graders reporting all other levels of parental education showed no consistent pattern of increases or decreases across the assessment years with no significant differences between 1996 and 1984 average scores.

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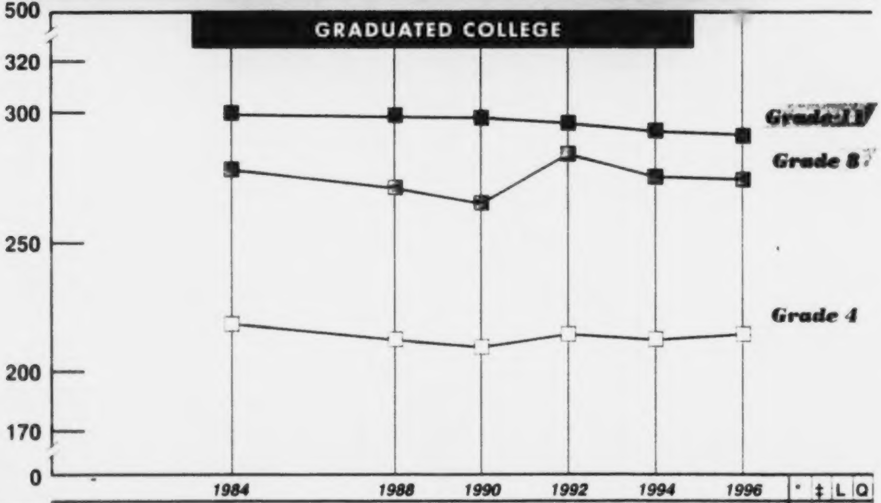
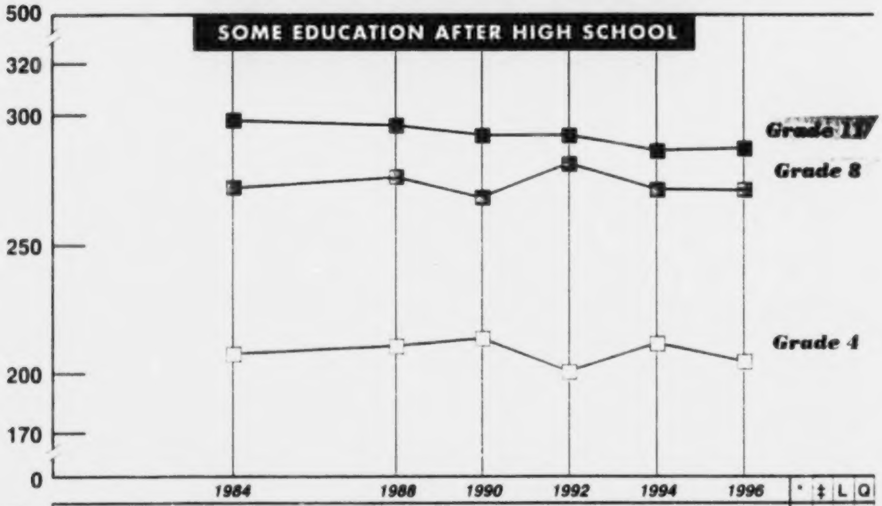
[14] Looker, E.D. (1989) Accuracy of proxy reports of parental status characteristics. *Sociology of Education, 62* (4), 257-276.

Figure 7.8

Trends in Average Writing Scale Scores by Parents' Highest Level of Education, 1984 to 1996


GRADUATED COLLEGE

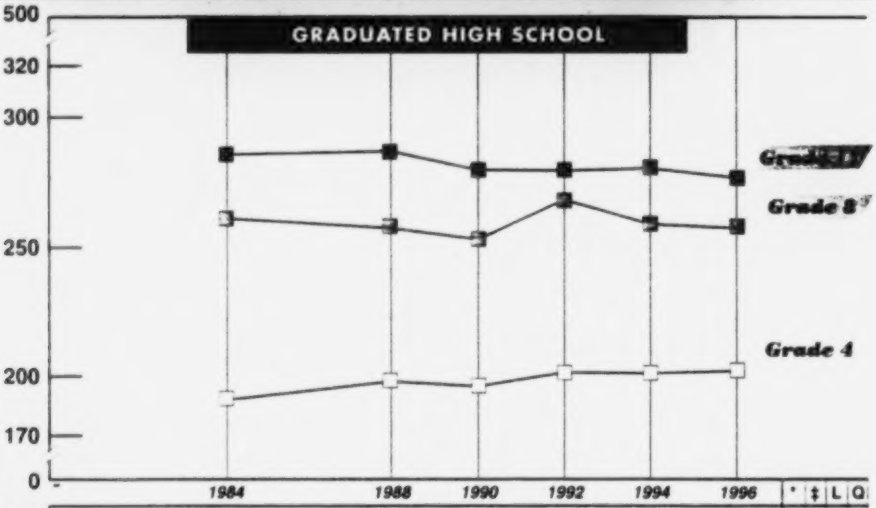
	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	300(2.4) 36(1.7)	299(2.0) 41(1.8)	298(2.0) 41(1.4)	296(1.4) 43(1.4)	293(1.5) 44(1.9)	291(1.9) 46(1.8)	–		–	
Grade 8	278(1.8) 36(1.5)	271(1.8) 41(1.5)	265(1.8) 38(1.5)	284(1.9) 44(1.8)	275(1.3) 46(1.6)	274(1.3) 45(1.9)				
Grade 4	218(3.0) 33(1.4)	212(2.2) 41(1.5)	209(1.6) 40(1.6)	214(1.4) 42(1.0)	212(2.1) 43(1.4)	214(1.7) 43(1.3)				


SOME EDUCATION AFTER HIGH SCHOOL

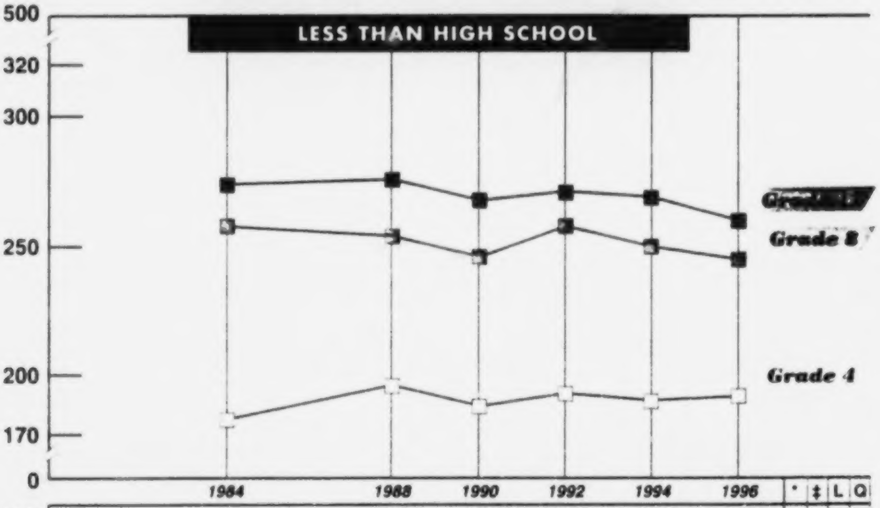
	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	298(2.5) 15(0.9)	296(2.6) 18(0.8)	292(2.7) 19(0.6)	292(2.0) 20(0.8)	286(1.7) 20(1.0)	287(2.1) 19(0.7)	–		–	
Grade 8	271(3.9) 10(0.8)	275(3.3) 11(0.6)	267(3.0) 12(0.7)	280(2.2) 12(0.7)	270(3.1) 12(0.7)	270(2.4) 11(0.6)				
Grade 4	208(6.5) 5(0.4)	211(6.3) 5(0.5)	214(4.0) 5(0.4)	201(4.5) 6(0.4)	212(4.0) 5(0.5)	205(5.2) 5(0.4)				

Figure 7.8
(continued)

Trends in Average Writing Scale Scores by Parents' Highest Level of Education, 1984 to 1996



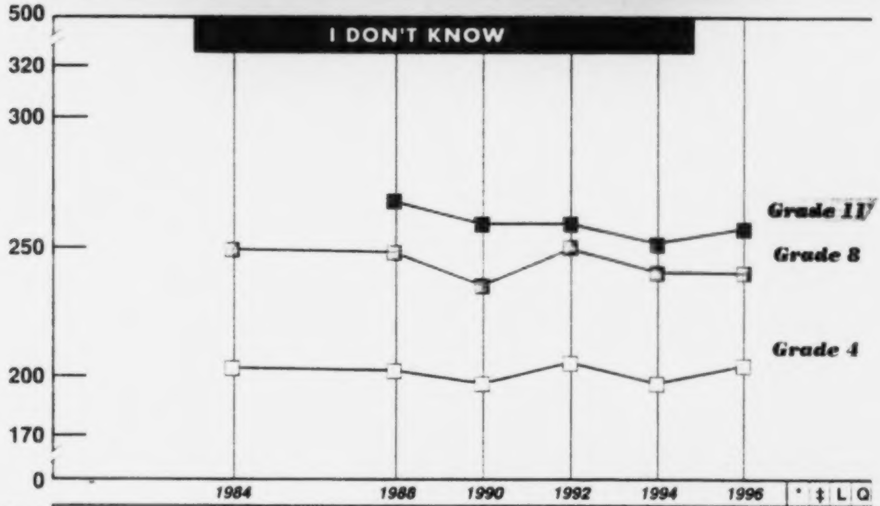
	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	284(3.0) 35(2.1)	285(2.2) 30(1.2)	278(1.9) 30(1.1)	278(2.2) 27(0.9)	279(1.7) 26(1.1)	275(1.6) 26(1.6)			–	
Grade 8	261(1.6) 35(1.3)	258(2.1) 32(1.2)	253(1.4) 33(1.1)	268(1.6) 29(1.1)	259(2.2) 27(1.4)	258(1.9) 29(1.4)				
Grade 4	192(3.4) 21(1.0)	199(3.0) 18(1.1)	197(3.0) 18(0.9)	202(3.2) 17(0.7)	202(2.3) 16(0.9)	203(2.3) 16(0.8)	+		+	



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	274(5.2) 11(1.2)	276(3.5) 8(0.8)	268(4.0) 9(0.5)	271(3.7) 8(0.8)	269(4.7) 8(0.7)	260(3.0) 7(0.6)				
Grade 8	258(4.8) 10(0.8)	254(3.9) 9(0.7)	246(3.7) 8(0.6)	258(5.3) 7(0.8)	250(4.1) 7(0.4)	245(4.5) 7(0.6)				
Grade 4	179(4.6) 7(0.6)	194(5.4) 5(0.7)	186(3.9) 6(0.5)	191(3.2) 5(0.4)	188(7.8) 4(0.4)	190(5.5) 4(0.4)				

Figure 7.8
(continued)

Trends in Average Writing Scale Scores by Parents' Highest Level of Education, 1984 to 1996



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	***(***) 3(0.5)	268(4.7) 3(0.3)	259(4.1) 3(0.3)	259(6.6) 3(0.3)	251(3.2) 3(0.2)	257(4.4) 3(0.3)				
Grade 8	249(6.7) 9(0.8)	248(2.3) 8(0.5)	235(2.8) 10(0.6)	250(3.1) 8(0.6)	240(2.8) 8(0.6)	240(2.5) 9(0.5)				
Grade 4	203(2.5) 35(1.3)	202(2.7) 30(1.4)	197(2.2) 32(1.1)	205(2.3) 31(1.0)	197(1.9) 31(1.2)	204(1.7) 33(0.9)				

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

*** Sample size insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Trends in Writing Scale Scores by Type of School from 1984 to 1996

The average writing scale scores for students attending public and nonpublic schools are presented in Figure 7.9.[15] A comparison of the 1996 average scores of public and nonpublic school students revealed no significant differences at the eleventh grade. At the fourth and eighth grades, however, students attending nonpublic schools had a higher average writing score in 1996 than did their public school peers. In interpreting these results, it is important to consider the different factors that may influence the relative performance of public and nonpublic school students. Performance differences between students in the two types of schools may be accounted for by a variety of socioeconomic and sociological aspects of students' home and school experiences.[16]

Public School Students. Among eleventh-grade public school students, an overall pattern of declining writing scores was observed, and the 1996 average score was lower than the 1984 average. Trend analyses of the writing scores of fourth- and eighth-grade students attending public schools revealed no overall pattern of increases or decreases in performance. In addition, the 1996 average scores of students at these two grade levels was not significantly different from the 1984 averages.

Nonpublic School Students. At grade 11, the trend in performance for nonpublic school students was an overall pattern of decreased performance; however, the 1996 average score was not significantly lower than the 1984 average. Similar to their public school peers, fourth and eighth graders attending nonpublic schools displayed no overall pattern of increases or decreases in writing performance across the assessments, and no significant differences between their 1996 and 1984 average scores.

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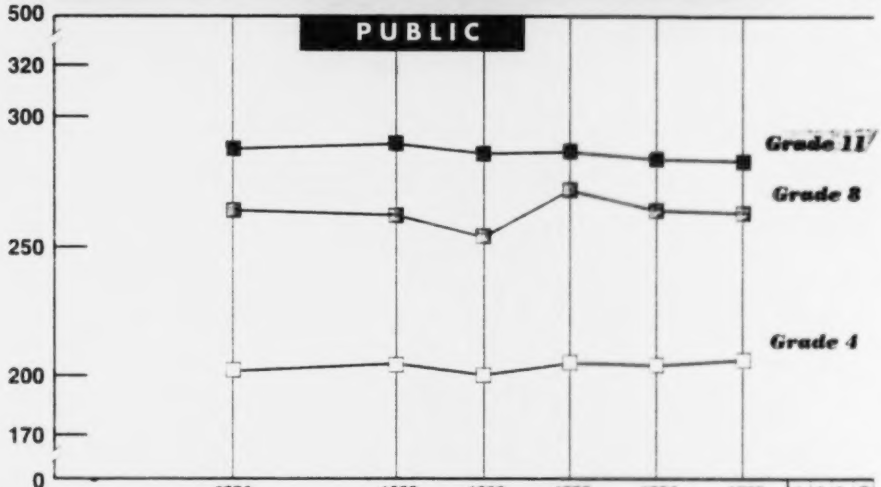
[15] Nonpublic schools include Catholic and other private schools.

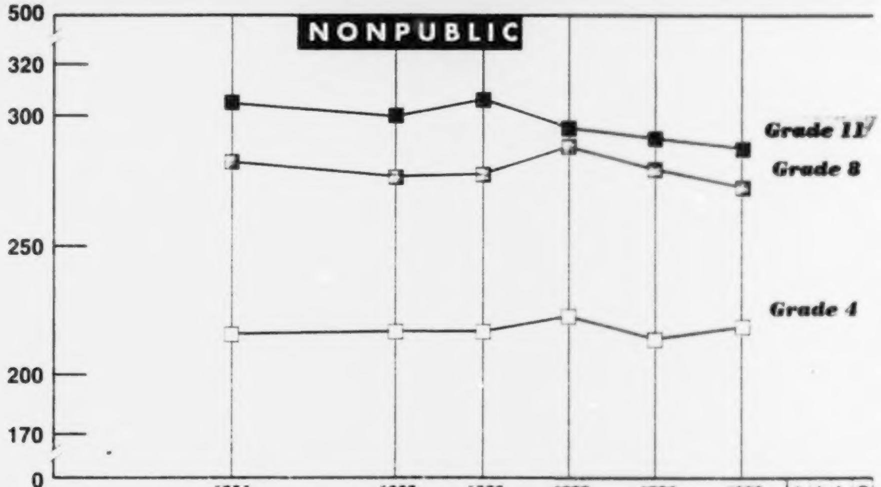
[16] Alexander, K. L., & Pallas, A. M. (1988) Private schools and public policy: New evidence on congnitive achievement in public and private schools. *Sociology of Education*, *56* 170-182.

Newman, J. W. (1995). Comparing private schools and public schools in the 20th Century: History, demography, and the debate over choice. *Educational Foundations*, 9(3), 5-18.

Figure 7.9 Trends in Average Writing Scale Scores by Type of School, 1984 to 1996



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	288(1.6) 89(1.5)	290(1.2) 86(3.8)	286(1.1) 92(1.7)	287(1.6) 91(2.2)	284(1.4) 88(2.2)	283(1.4) 91(1.7)	–		–	
Grade 8	264(2.0) 87(1.6)	262(1.5) 88(2.7)	254(1.2) 87(1.9)	272(1.3) 87(2.0)	264(1.6) 89(1.6)	263(1.2) 89(1.9)				
Grade 4	202(1.8) 86(1.9)	204(2.0) 88(3.0)	200(1.4) 92(1.8)	205(1.6) 88(1.7)	204(1.8) 90(2.0)	206(1.5) 86(1.6)				



	1984	1988	1990	1992	1994	1996	*	‡	L	Q
Grade 11	305(3.7) 11(1.5)	300(3.6) 14(3.8)	306(5.2) 8(1.7)	295(4.4) 9(2.2)	291(3.8) 12(2.2)	287(6.6) 9(1.7)			–	
Grade 8	282(5.5) 13(1.6)	276(3.0) 12(2.7)	277(4.4) 13(1.9)	288(3.2) 13(2.0)	279(3.8) 11(1.6)	272(3.3) 11(1.9)				
Grade 4	215(4.6) 14(1.9)	216(4.1) 13(3.0)	216(5.7) 8(1.8)	222(3.3) 12(1.7)	213(4.3) 10(2.0)	218(3.2) 14(1.6)				

Below each average scale score, the corresponding percentage of students is presented.

Standard errors of the estimated scale scores and percentages appear in parentheses.

* Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the average scale score in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Summary

- Trends in overall student performance on the writing trend assessment varied at the different grades. While the performance of fourth graders remained relatively stable and the performance of eighth graders fluctuated across assessment years, in 1996 the average scores of fourth and eighth graders were not significantly different from those in 1984. The performance of eleventh graders showed a pattern of decline across assessment years and their average score was lower in 1996 than in 1984.

- Among fourth graders, the percentage of students performing at or above Level 150 on the NAEP writing scale decreased until 1990, but increased after that time. However, there were no significant changes across the assessment years in the percentages of students who attained any of the performance levels. At grade 8, there was an overall decline in the percentage of students performing at or above Level 200, resulting in a 1996 percentage that was lower than that in 1984. The percentage of eighth graders at or above Level 250 has rebounded since the low point reached in 1990; however, the percentage in 1996 remained lower than the percentage in 1984. Trend analysis revealed an overall pattern of increases across the assessment years in the percentage of eighth graders at or above Level 300; however, the percentage of students in 1996 was not significantly different from that in 1984. Among eleventh graders, there was an overall decline in the percentages of students who attained at least Levels 250 and 300, resulting in 1996 percentages that were lower than those in 1984.

- The average writing scale scores for fourth graders in the upper, middle two, and lower quartiles of the performance distribution showed no significant changes in performance since 1984. Eighth graders in the upper quartile showed an overall pattern of improved performance, while those in the middle two and lower quartiles showed no overall pattern of increase or decrease. For eighth graders in all quartiles of the performance distribution, averages scores in 1996 were not significantly different from 1984. The average writing score for eleventh graders in the upper quartile did not change significantly from 1984 to 1996. Eleventh graders in the middle two and lowest quartiles showed overall patterns of decline. This pattern resulted in a lower 1996 average score for the middle quartiles, whereas the 1996 average for the lowest quartile did not differ significantly from the 1984 average.

- White, Black, and Hispanic fourth graders' scores showed no consistent pattern of increases or decreases and no significant changes across the trend assessments. While average scores for White, Black, and Hispanic eighth graders have fluctuated over the years, the average score in 1996 for each of these racial/ethnic subgroups did not differ significantly from that in 1984. Among eleventh graders, the average score of White students showed an overall pattern of decline that resulted in a 1996 average lower than in 1984. No significant change across the assessments was observed for Black eleventh graders. An overall pattern of early increases and subsequent declines characterized the scores of Hispanic eleventh graders; however, their average score in 1996 did not differ significantly from that in 1984.

- Male and female fourth graders' performance remained relatively stable across the assessments. The performance of male and female eighth graders fluctuated over time. The average score for males in 1996 was lower than that in 1984, but for females there was no significant difference in performance between the first and most recent assessments.

An overall pattern of decline was observed in the performance of male and female eleventh graders; in 1996 the average score for males was lower than that in 1984, but for females there was no significant difference between the first and most recent assessments.

- At each grade in 1996, White students outperformed their Black and Hispanic peers, and female students outperformed male students. No statistically significant change in the scale score gaps between the various subgroups were observed across the assessment years.
- In the Northeast region, no significant changes were observed across the assessment years at grades 4 and 11. A decline in the average score of eighth graders between 1994 and 1996 was observed, but no significant difference between 1984 and 1996 average scores occurred. In the Southeast region, no significant change occurred at fourth or eighth grades. At grade 11, average scores displayed an overall pattern of decline, but the average score in 1996 did not differ significantly from the 1984 average. In the Central region, an overall pattern of improvement was seen in the performance of fourth and eighth graders, resulting in a 1996 average score that was higher than that in 1984 for fourth graders, but not significantly different for eighth graders. No significant change was seen at grade 11. In the West region, no significant changes in performance were observed at any of the three grades between the first and most recent assessments.
- For each grade level, increases from 1984 to 1996 were observed in the percentages of students who reported that one or both parents had graduated from college, while decreases were found in the percentages of students whose parents had graduated high school or received less than a high school education. At all grades, higher writing scale scores were associated with higher levels of parental education.
- Fourth graders who reported that high school graduation was their parents' highest level of education displayed a pattern of increasing scores across the years, resulting in a 1996 average score that was higher than the 1984 average. With a pattern of fluctuating scores that parallel that observed in the overall results for the nation, there were no significant changes between 1984 and 1996 in the average scores of eighth graders at any level of parental education. Eleventh graders who reported the three highest levels of parental education displayed an overall pattern of decreasing scores across the assessment years. For eleventh-grade students who reported that at least one parent had some education after high school or graduated from college, the 1996 average score was lower than the 1984 average.
- In 1996, the average writing scores of fourth- and eighth-grade students attending public schools were lower than those of their nonpublic school peers. No significant performance difference was observed between public and nonpublic school eleventh graders. At grades 4 and 8, public and nonpublic school students displayed no overall pattern of increases or decreases; their average scores in 1996 were not significantly different from the 1984 averages. Public and nonpublic students in grade 11 displayed an overall pattern of declining scores, resulting in a 1996 average score that was below the 1984 average for students attending public schools, but not significantly different for students attending non-public schools.

Chapter 8

Students' Experiences in Writing

In addition to responding to various writing tasks, students participating in the writing trend assessments were asked to respond to a series of questions related to their writing activities, their strategies for managing the writing process, and their instructional experiences. This chapter presents the reports of students in 1984 and in 1996 on these aspects of their writing experiences.

Writing Instruction

To better understand the state of writing achievement, NAEP looked at various factors that influence students in school. Research on effective instructional practices in writing emphasizes that students should write frequently and for a wide range of purposes.[17] Also, researchers and educators continue to support teacher feedback on student writing that communicates high expectations for all students, that emphasizes the students' authority over their writing, and that supports students throughout the writing process.[18]

To document changes in writing instruction, several questions in the trend writing assessments focused on the kinds and amounts of writing that students do in school, and on the kinds of responses that students receive from their teachers.

Tables 8.1a and 8.1b present students' responses to a question about the kinds of writing they did for their English class during the week before the administration of the NAEP writing assessment. At all three grades, students reported more frequent writing of essays, compositions, or themes in 1996 than in 1984. At grades 4 and 8, there was an increase in the frequency of writing stories. Among eighth and eleventh graders, students' responses indicated more frequent writing of letters, poems, and reports other than book reports in 1996 than in 1984.

In 1996, there was little evidence of a positive relationship between frequency of specific writing activities and average writing scores. This finding might be explained, in part, by the difficulty students may have in categorizing the types of writing tasks and class work they are assigned. At the fourth grade, in particular, students may not be able to distinguish between work done for language arts instruction and work done for other subject areas. Also, it may indicate that lower performing students are assigned more writing activities. In considering the relationship between frequency of specific writing activities and average writing scores, it is important to note that for any of the types of writing listed in Tables 8.1a and 8.1b, few students (11 percent or less) reported having written three or more papers of that type in the previous week. Furthermore, interpretation of these findings should take into account the nature of the question asked. The question focused on types of writing that students had engaged in during the week prior to the assessment. Thus, these data provide only a limited view of the types of writing that students completed in their classes and the relationship between the frequency of these writing activities and their performance on the NAEP assessment.

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[17] Langer, J. A., & Allington, R. (1992). Curriculum research in reading and writing. In P. Jackson (Ed.), *Handbook of research on curriculum* (pp. 687-725). New York, NY: Macmillan.

[18] Rubin, D. (1995). *Teaching elementary language arts* (5th edition). Boston, MA: Allyn and Bacon.

Table 8.1a

Types of Writing for English Class at Grades 4, 8, and 11, 1984 and 1996

THE NATION'S REPORT CARD

Students' Reports on How Many of Various Types of Papers They Wrote for English Class Last Week			Three or More		One or Two		None	
	Grade	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Essay, composition, or theme	4	1996	3(0.4)	194(8.5)	23(1.4) *	204(2.4)	74(1.5) *	209(1.2)
		1984	3(0.7)	***(***)	16(1.5)	206(4.1)	81(1.7)	206(1.9)
	8	1996	6(0.4) *	259(3.6)	49(1.6) *	268(1.1)	45(1.8) *	262(1.4)
		1984	4(0.5)	271(3.0)	37(1.8)	271(1.8)	59(1.9)	268(2.5)
	11	1996	11(0.7) *	281(2.5)	58(1.1) *	284(1.4) *	31(1.4) *	282(2.0) *
		1984	8(0.7)	282(3.2)	52(1.4)	292(1.7)	40(1.3)	290(2.4)
Book report	4	1996	6(0.6)	194(4.2)	31(1.5)	203(2.2)	64(1.8)	211(1.3)
		1984	6(0.7)	193(7.0)	31(1.4)	206(2.7)	64(1.5)	206(2.0)
	8	1996	4(0.4)	246(3.7)	31(1.9)	262(1.5)	65(2.0)	267(1.2)
		1984	3(0.6)	***(***)	32(1.6)	267(2.2)	65(1.7)	271(2.5)
	11	1996	5(0.5)	269(3.8)	27(1.0)	279(1.6)	68(1.1)	286(1.3) *
		1984	4(0.6)	266(4.9)	26(1.3)	282(2.5)	70(1.6)	295(1.7)
Other reports	4	1996	4(0.4)	192(6.7)	28(1.2)	206(1.9)	68(1.3)	209(1.3)
		1984	3(0.6)	***(***)	25(1.7)	202(2.8)	72(1.8)	207(2.0)
	8	1996	4(0.3) *	251(4.0)	35(1.3) *	265(1.5)	61(1.4) *	265(1.2)
		1984	3(0.4)	***(***)	24(1.3)	268(2.5)	74(1.5)	270(2.3)
	11	1996	6(0.4)	278(2.8)	43(1.3) *	283(1.5)	51(1.2) *	284(1.6) *
		1984	5(0.7)	277(4.4)	33(1.0)	287(2.2)	62(1.0)	293(1.9)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table 8.1b

Types of Writing for English Class at Grades 4, 8, and 11, 1984 and 1996

Students' Reports on How Many of Various Types of Papers They Wrote for English Class Last Week			Three or More		One or Two		None	
	Grade	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Letter	4	1996	5(0.5)	190(5.9)	35(1.3)	205(2.0)	60(1.3)	210(1.5)
		1984	6(0.6)	191(5.7)	32(1.5)	204(3.1)	62(1.6)	208(1.8)
	8	1996	4(0.4)	255(4.1)	27(1.3) *	261(1.6)	69(1.5) *	267(1.1)
		1984	4(0.7)	265(4.5)	17(1.1)	264(2.1)	79(1.3)	271(2.2)
	11	1996	4(0.5)	272(3.8)	20(1.3) *	274(2.8)	76(1.5) *	286(1.2) *
		1984	3(0.5)	272(4.7)	13(1.1)	276(2.2)	84(1.1)	293(1.7)
Story	4	1996	5(0.6)	195(4.5)	43(1.7) *	207(1.8)	52(2.0) *	209(1.5)
		1984	6(0.8)	197(5.8)	32(1.9)	204(3.2)	63(2.1)	207(1.8)
	8	1996	5(0.4)	253(2.9)	45(1.3) *	263(1.6)	50(1.4) *	267(1.1)
		1984	4(0.5)	263(3.8)	37(1.7)	268(2.4)	59(1.6)	271(2.5)
	11	1996	7(0.5)	274(2.9)	36(1.0)	277(1.2) *	57(1.0)	288(1.5) *
		1984	6(0.5)	276(4.0)	34(1.6)	283(1.8)	60(1.6)	296(2.0)
Poem	4	1996	4(0.6)	194(4.4)	24(1.3)	203(2.3)	72(1.6)	210(1.7)
		1984	4(0.6)	***(***)	22(1.6)	200(2.8)	74(1.7)	207(1.8)
	8	1996	4(0.5)	264(4.5)	19(1.0) *	261(1.8)	77(1.2) *	265(1.2)
		1984	3(0.8)	***(***)	12(0.9)	263(3.5)	85(1.3)	271(2.2)
	11	1996	7(0.7) *	280(2.5)	23(1.3) *	278(2.0)	71(1.6) *	285(1.5) *
		1984	4(0.5)	286(4.0)	14(1.0)	279(2.4)	82(0.9)	292(1.8)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Eighth- and eleventh-grade students were also asked a set of questions about the types of comments teachers made on their writing assignments. Students' responses to these questions are presented in Tables 8.2a and 8.2b. Among eighth graders, students reports indicated more frequent comments from teachers in 1996 than in 1984 about the way students explained ideas in their papers. According to the reports of both eighth and eleventh graders, there was also evidence of an increase in the frequency with which teachers commented on the ideas in students' papers and the ways in which students' expressed feelings in their papers.

At both grades 8 and 11 in 1996, students who reported that their teachers never or hardly ever commented on whether they had followed directions or on whether they had written enough had higher average writing scores than their peers who said their teachers made these types of comments more than half the time. Similarly, eleventh graders who reported that their teachers never or hardly ever commented on neatness and handwriting had higher average scores than their peers whose teachers did so more than half the time.

Table 8.2a

Teachers' Comments on Completed Papers at Grades 8 and 11, 1984 and 1996

Students' Reports on How Often Teachers Comment on Aspects of Their Papers			More Than Half the Time		About Half the Time		Less Than Half the Time		Never or Hardly Ever	
	Grade	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Ideas in paper	8	1996	47(1.9)	262(2.4)	23(1.5)	260(3.0)	17(1.2)	264(3.0)	13(0.9) *	262(2.5)
		1984	41(1.8)	267(3.6)	23(1.3)	268(3.2)	17(1.4)	269(3.4)	19(1.4)	267(3.8)
	11	1996	49(1.9) *	284(2.1)	24(1.6)	280(2.4)	17(1.1) *	286(3.6)	10(1.1)	280(5.2)
		1984	40(1.8)	289(2.6)	23(2.0)	283(3.3)	24(2.3)	288(4.4)	14(1.6)	288(5.9)
Way ideas explained	8	1996	45(2.2) *	262(2.2)	23(1.8)	262(3.4)	20(1.1)	264(3.6)	13(1.0)	260(3.6)
		1984	37(1.7)	266(3.5)	25(1.9)	267(3.5)	21(1.9)	267(3.3)	17(1.9)	271(5.0)
	11	1996	47(2.2)	285(2.2)	25(1.8)	281(3.1)	17(1.0)	281(2.5)	11(0.8)	281(5.6)
		1984	40(2.2)	287(2.6)	25(2.0)	282(4.1)	23(2.1)	292(3.1)	13(1.5)	290(5.1)
Way feelings expressed	8	1996	40(2.2)	262(2.7)	22(1.5)	263(3.3)	19(1.2)	262(4.0)	19(1.1) *	262(2.8)
		1984	33(2.2)	265(3.4)	21(2.3)	268(4.0)	21(2.1)	271(3.8)	26(1.8)	266(3.1)
	11	1996	40(1.9) *	283(2.0)	20(1.4)	281(2.7)	22(1.3)	285(2.8)	18(0.8)	284(3.7)
		1984	31(2.3)	285(3.1)	25(1.8)	285(4.3)	25(1.7)	289(3.3)	19(1.6)	292(3.9)
Organization	8	1996	47(2.0)	262(2.0)	21(1.2)	259(3.5)	17(1.1)	265(3.2)	15(0.9)	260(3.6)
		1984	43(2.0)	267(3.0)	22(1.3)	266(3.4)	16(1.2)	270(3.2)	19(2.0)	267(3.7)
	11	1996	46(1.8)	283(2.1)	23(1.5)	280(2.5)	18(1.3)	283(3.4)	13(0.8)	288(5.4)
		1984	40(2.1)	288(3.0)	21(1.8)	287(4.0)	22(1.6)	286(3.3)	17(1.4)	289(6.3)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table 8.2b

Teachers' Comments on Completed Papers at Grades 8 and 11, 1984 and 1996

Students' Reports on How Often Teachers Comment on Aspects of Their Papers			More Than Half the Time		About Half the Time		Less Than Half the Time		Never or Hardly Ever	
	Grade	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Followed directions	8	1996	44(1.7)	257(2.0)	18(1.0)	260(2.7)	18(1.3)	266(3.5)	19(1.1)	270(2.8)
		1984	42(1.8)	262(3.0)	18(1.8)	270(3.5)	19(1.8)	268(3.5)	22(1.5)	274(3.3)
	11	1996	34(2.0)	277(3.3)	16(1.3)	278(4.2)	21(1.3)	284(2.9)	30(1.5)	292(3.4)
		1984	30(2.4)	277(3.2)	16(1.5)	284(5.5)	22(1.9)	290(3.5)	31(1.8)	297(3.0)
Wrote enough	8	1996	37(1.8)	258(2.2)	22(1.3)	256(2.9)	19(1.2)	270(3.0)	22(1.3)	268(2.7)
		1984	33(1.9)	263(3.5)	23(1.9)	264(3.6)	24(1.5)	270(3.8)	21(1.5)	274(2.9)
	11	1996	30(1.8)	278(3.1)	20(1.3)	276(3.1)	23(1.5)	284(2.6)	27(1.3)	293(4.0)
		1984	26(2.0)	281(3.1)	19(1.7)	284(4.4)	27(2.3)	289(3.2)	28(2.1)	293(3.5)
Words	8	1996	45(1.7)	260(1.9)	20(1.1)	262(3.2)	19(1.3)	266(3.1)	17(1.1)	264(3.8)
		1984	38(2.3)	264(3.0)	23(1.5)	267(3.4)	21(1.7)	271(4.1)	19(1.6)	270(4.4)
	11	1996	36(1.7)	282(2.4)	22(1.3)	280(3.5)	23(1.1)	284(2.5)	20(1.2)	287(3.4)
		1984	32(1.6)	284(3.2)	24(1.7)	285(2.9)	22(1.5)	291(4.4)	23(1.7)	292(3.6)
Spelling, punctuation, and grammar	8	1996	50(1.7)	263(1.9)	21(1.4)	261(2.9)	16(0.7)	263(3.3)	13(1.1)	260(4.9)
		1984	51(1.9)	267(2.4)	20(1.9)	264(4.5)	15(1.3)	271(4.4)	14(1.5)	268(6.0)
	11	1996	45(1.8)	282(2.3)	17(1.5)	279(3.1)	21(1.2)	285(3.6)	18(1.4)	286(3.9)
		1984	45(2.3)	285(2.7)	18(1.5)	286(4.3)	20(1.9)	289(3.6)	17(1.7)	294(3.0)
Neatness and handwriting	8	1996	42(1.5)	259(1.8)	18(1.0)	261(3.7)	14(1.1)	264(3.0)	25(1.2)	267(2.7)
		1984	48(2.2)	265(2.6)	14(1.6)	270(4.0)	15(1.5)	268(5.2)	22(1.9)	270(3.3)
	11	1996	31(1.8)	277(2.7)	13(1.0)	279(3.2)	18(1.4)	283(3.2)	39(2.0)	289(2.6)
		1984	31(2.7)	277(3.2)	10(1.0)	278(4.9)	16(1.3)	287(5.1)	44(2.5)	296(2.3)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table 8.3 presents fourth and eighth graders' responses to a related series of questions about the types of feedback (oral or written) about their writing that they received from teachers. Between 1984 and 1996, fourth-grade students' reports indicated a decline in the frequency with which teachers marked mistakes. Among eighth graders, students' reports indicated that teachers were more likely in 1996 than in 1984 to write notes or to point out what is well done on their writing assignments.

In 1996, the average writing score of eighth graders who reported that their teachers marked mistakes more than half the time was higher than that of students who reported that their teachers never or hardly ever gave this type of feedback.

Table 8.3

Teachers' Feedback on Writing at Grades 4 and 8, 1984 and 1996

Students' Reports on How Often Teachers Provide Types of Feedback When They Write	Grade	Year	More Than Half the Time		About Half the Time		Less Than Half the Time		Never or Hardly Ever	
			Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Mark mistakes	4	1996	51(1.7) *	208(2.0)	16(1.2)	210(3.0)	19(1.3) *	210(3.0)	15(1.2)	203(3.7)
		1984	60(2.5)	204(2.3)	15(1.6)	206(5.3)	12(1.6)	200(5.5)	12(1.6)	203(4.8)
	8	1996	62(1.9)	266(1.9)	14(1.1)	265(3.0)	15(1.3)	263(3.4)	9(0.7)	253(3.7)
		1984	69(1.7)	268(2.3)	11(1.1)	260(5.8)	11(1.2)	257(6.7)	9(1.0)	***(***)
Write notes	4	1996	30(1.0)	203(2.6)	16(0.9)	215(3.7)	17(0.9)	206(3.0)	37(1.1)	210(2.5)
		1984	31(2.2)	203(3.1)	13(1.4)	204(4.3)	13(1.4)	212(5.3)	43(2.3)	201(2.3)
	8	1996	47(1.7) *	265(2.1)	21(1.2)	264(2.7)	18(1.1)	265(3.2)	13(1.0) *	261(3.8)
		1984	38(1.9)	267(3.2)	19(1.4)	266(4.0)	19(1.9)	265(3.6)	24(1.6)	260(4.4)
Point out what is well done	4	1996	54(1.6)	209(1.9)	18(1.4)	207(2.9)	12(1.1)	211(4.2)	16(1.1)	204(4.0)
		1984	54(2.4)	203(2.4)	18(1.3)	205(4.6)	9(1.2)	202(6.0)	19(1.7)	204(4.0)
	8	1996	52(1.4) *	266(1.9)	22(1.1)	266(2.6)	14(1.2)	263(3.5)	12(0.8) *	259(3.7)
		1984	39(2.5)	268(2.5)	23(1.7)	266(3.8)	18(1.3)	265(4.1)	19(1.4)	259(5.6)
Point out what is not well done	4	1996	45(1.7)	207(2.1)	18(1.1)	212(2.8)	17(1.2)	207(2.7)	21(1.4)	207(3.0)
		1984	50(1.9)	204(2.2)	17(1.8)	208(4.9)	13(1.5)	198(4.6)	20(1.6)	202(4.7)
	8	1996	57(1.7)	265(1.7)	18(1.4)	265(2.5)	15(1.0)	267(2.8)	11(1.1)	261(3.6)
		1984	54(2.9)	268(2.1)	19(1.9)	263(4.6)	14(1.6)	263(5.5)	14(1.5)	260(6.3)
Make suggestions for next time	4	1996	53(1.6)	206(1.8)	15(1.1)	212(3.3)	13(1.1)	210(3.3)	19(1.4)	208(2.9)
		1984	50(2.3)	202(2.7)	17(1.7)	203(3.9)	15(1.4)	210(6.0)	18(1.9)	203(4.2)
	8	1996	55(1.8)	265(1.6)	19(1.0)	263(2.9)	13(1.1)	265(2.8)	13(1.1)	262(3.9)
		1984	49(2.0)	263(2.9)	21(1.5)	271(4.2)	16(1.5)	266(4.2)	15(1.4)	264(5.0)
Show an interest in what you write	4	1996	60(1.7)	208(1.8)	19(1.3)	209(2.7)	11(1.1)	207(5.7)	11(0.9)	203(4.0)
		1984	61(2.2)	203(2.4)	17(1.9)	208(5.8)	11(1.3)	201(6.6)	11(1.4)	204(4.5)
	8	1996	56(1.6)	267(1.6)	19(1.1)	266(2.6)	14(1.0)	259(4.1)	11(0.9)	259(3.6)
		1984	49(2.7)	266(3.1)	20(1.6)	265(4.6)	15(1.5)	264(4.1)	16(1.8)	263(5.2)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Managing the Writing Process

As a part of the instructional context created by the activities and methods used in the classroom, teachers seek to help students develop effective strategies for managing the writing process, including strategies for planning and revising. Previous studies and earlier NAEP reports have shown that students who make use of a variety of strategies are more effective writers.[19] A variety of questions asked students about the revising and editing strategies they use, including their attention to writing conventions (spelling, punctuation, and grammar) as well as to the structure and organization of the text as a whole. Their responses are presented in Tables 8.4a and 8.4b.

At grade 4, there was evidence of increased use of three different revising and editing strategies between 1984 and 1996: correcting grammar, changing words, and taking out parts that are not liked. The reports of eighth graders indicated a greater tendency to move sentences or paragraphs in 1996 than in 1984. At the eleventh grade, there was a decrease between 1984 and 1996 in the frequency with which students rewrote most of their papers. At all three grades, students' reports indicated a decrease in throwing out and starting over as a strategy for revising or editing their writing.

For many of the revising and editing strategies that students reported in 1996, there was a significant relationship between strategy use and average writing scores. At grade 4, students who reported correcting grammar more than half the time when they write had higher average writing scores than their peers who reported never or hardly ever using these strategies. At grade 8, students who reported using the following strategies more than half the time had higher average writing scores than their peers who reported never or hardly ever doing so: correcting grammar, changing words, adding ideas or information, taking out parts they do not like, and moving sentences or paragraphs. At grade 11, students who reported taking out parts they do not like, or moving sentences or paragraphs, more than half the time when they write had higher average writing scores than their peers who reported never or hardly ever doing so. One of the revising and editing strategies was negatively related to average writing scores: throwing out and starting over. At grades 4 and 8, students who reported using this strategy more than half the time had lower average writing scores than their peers who reported never or hardly doing so.

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[19] Applebee, A. N., Langer, J. A., Mullis, I. V. S., Latham, A. S., & Gentile, C. A. (1994). *NAEP 1992 writing report card.* Washington, DC: National Center for Education Statistics.

Table 8.4a

Use of Specific Revising and Editing Strategies at Grades 4, 8 and 11, 1984 and 1996

THE NATION'S REPORT CARD naep

Students' Reports on How Often They Use Strategies	Grade	Year	More Than Half the Time		About Half the Time		Less Than Half the Time		Never or Hardly Ever	
			Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Correct spelling	4	1996	78(1.6)	209(2.4)	9(0.7)	199(4.7)	7(1.1)	206(5.5)	7(0.7)	198(6.4)
		1984	75(1.7)	206(2.1)	10(1.3)	203(7.0)	6(1.1)	***(***)	9(0.9)	***(***)
	8	1996	77(1.4)	266(1.6)	12(0.8)	255(3.8) *	6(0.8)	265(6.2)	5(0.6)	***(***)
		1984	75(1.7)	267(2.2)	12(1.3)	273(5.3)	6(1.1)	***(***)	7(1.2)	***(***)
	11	1996	78(1.8)	285(1.3) *	12(1.2)	274(4.1)	6(0.7)	276(5.5)	5(0.6)	***(***)
		1984	76(2.4)	294(2.4)	10(1.3)	***(***)	9(1.5)	***(***)	5(1.4)	***(***)
Correct punctuation	4	1996	69(1.2)	209(2.5)	11(1.1)	208(3.6)	9(0.8)	202(4.8)	12(1.0)	201(3.7)
		1984	65(2.5)	206(2.7)	12(1.7)	206(5.9)	10(1.4)	200(3.4)	14(2.1)	196(4.8)
	8	1996	70(1.3)	266(1.6)	13(1.0)	257(3.0)	10(0.9)	259(4.2)	7(0.7)	251(5.3)
		1984	69(2.0)	268(2.1)	12(1.3)	270(5.7)	10(1.4)	***(***)	9(1.6)	***(***)
	11	1996	71(1.6)	284(1.6) *	13(1.1)	275(3.7)	10(1.0)	282(3.4)	5(0.6)	278(6.1)
		1984	70(2.7)	294(2.4)	12(1.3)	281(6.5)	11(1.9)	***(***)	7(1.5)	***(***)
Correct grammar	4	1996	57(1.5)	210(2.7)	14(1.2)	209(4.1)	10(1.0)	209(4.2)	18(1.3) *	197(4.0)
		1984	51(2.1)	205(2.6)	11(1.2)	209(6.5)	9(0.9)	***(***)	29(2.1)	201(3.9)
	8	1996	69(1.3)	267(1.7)	14(0.9)	255(3.1) *	10(0.7)	257(4.6)	7(0.6)	249(5.9)
		1984	65(2.2)	269(2.4)	17(1.9)	268(3.7)	10(1.5)	***(***)	8(1.4)	***(***)
	11	1996	72(1.3)	284(1.6) *	15(1.0)	277(2.9)	9(0.9)	279(3.7)	5(0.5)	***(***)
		1984	70(2.3)	294(2.5)	13(1.3)	286(5.0)	11(1.7)	***(***)	6(1.0)	***(***)
Change words	4	1996	70(1.3) *	209(2.8)	13(1.0)	210(3.6)	8(0.8)	202(4.9)	9(1.0) *	196(5.5)
		1984	62(2.2)	206(2.4)	15(1.4)	206(5.2)	9(1.2)	198(4.7)	14(1.2)	196(5.7)
	8	1996	71(1.3)	267(1.9)	16(1.2)	259(2.3)	7(0.7)	250(5.3)	6(0.9)	238(6.0)
		1984	65(2.3)	271(2.7)	16(1.3)	266(3.8)	11(1.6)	***(***)	9(1.3)	***(***)
	11	1996	74(1.6)	286(1.7) *	17(1.4)	275(3.1)	5(0.5)	269(3.4)	4(0.6)	***(***)
		1984	71(2.5)	295(2.5)	16(2.0)	283(5.0)	8(1.3)	***(***)	4(1.1)	***(***)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table 8.4b

Use of Specific Revising and Editing Strategies at Grades 4, 8 and 11, 1984 and 1996

Students' Reports on How Often They Use Strategies	Grade	Year	More Than Half the Time		About Half the Time		Less Than Half the Time		Never or Hardly Ever	
			Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Add ideas or information	4	1996	67(1.2)	207(2.4)	14(1.0)	209(4.4)	11(1.0)	208(3.2)	8(0.8)	201(6.3)
		1984	61(2.0)	204(2.5)	17(1.5)	209(4.8)	10(1.5)	203(7.1)	12(1.3)	194(5.9)
	8	1996	67(1.6)	267(2.0)	21(1.4)	258(3.0)	6(0.8) *	254(6.0)	6(0.6)	243(5.1)
		1984	60(2.8)	270(2.6)	22(1.9)	269(3.3)	12(1.9)	***(***)	7(1.3)	***(***)
	11	1996	71(1.5)	286(1.4)	19(1.2)	276(3.0)	6(0.7)	268(6.6)	4(0.6)	***(***)
		1984	70(2.0)	293(2.6)	19(1.3)	289(4.5)	8(1.4)	***(***)	4(0.9)	***(***)
Take out parts you don't like	4	1996	52(1.5) *	208(2.6)	13(1.3)	213(4.8)	13(1.1)	209(4.0)	22(1.2) *	201(3.1)
		1984	45(2.1)	205(3.1)	13(1.4)	204(5.5)	11(1.2)	206(4.8)	32(2.0)	202(3.3)
	8	1996	60(1.6)	268(2.1)	21(1.5)	260(3.1)	12(0.9)	253(4.1)	8(1.0)	242(5.9)
		1984	56(2.2)	271(2.7)	20(1.8)	267(3.3)	13(1.8)	263(4.2)	11(1.5)	***(***)
	11	1996	65(1.8)	287(1.5) *	20(1.3)	276(3.1)	9(1.0)	273(3.8)	6(0.9)	267(6.2)
		1984	58(3.0)	295(2.5)	23(2.5)	285(5.2)	11(1.4)	285(5.7)	7(1.2)	***(***)
Move sentences or paragraphs	4	1996	40(1.4)	204(3.4)	19(1.2)	213(2.9)	14(1.3)	213(4.7)	27(1.2)	205(2.6)
		1984	44(2.0)	202(3.4)	16(1.3)	205(4.9)	12(1.5)	207(5.5)	27(1.8)	206(3.5)
	8	1996	39(1.6) *	268(2.4)	26(1.5)	264(2.0)	20(1.2)	262(3.6)	15(1.1) *	250(3.7)
		1984	30(2.0)	272(3.0)	28(2.2)	268(3.5)	19(1.8)	268(3.4)	23(2.4)	258(3.6)
	11	1996	45(1.8)	289(1.6)	25(1.3)	279(3.3) *	18(1.1)	278(3.0)	12(0.9)	273(3.0)
		1984	46(2.6)	295(3.2)	24(1.9)	292(3.5)	17(2.0)	287(5.7)	13(1.8)	276(4.6)
Rewrite most of the paper	4	1996	38(1.7)	205(2.6)	12(1.0)	207(4.6)	14(1.1)	210(4.3)	37(1.4)	209(2.7)
		1984	36(1.7)	201(2.7)	13(1.3)	207(5.2)	15(1.3)	202(4.2)	37(1.8)	207(3.1)
	8	1996	43(1.5)	262(1.8)	14(1.2)	263(2.4)	20(0.9)	266(2.8)	23(1.2)	261(2.7)
		1984	40(1.8)	268(2.7)	15(1.8)	268(3.8)	22(1.7)	271(3.3)	23(2.0)	262(4.6)
	11	1996	34(1.5) *	279(2.9) *	18(1.1)	283(4.3)	25(1.1)	285(3.2)	24(1.1) *	285(3.1)
		1984	44(2.6)	292(2.0)	18(1.4)	290(5.7)	21(2.3)	295(5.6)	17(1.6)	282(4.8)
Throw out and start over	4	1996	28(1.5)	199(2.5)	10(0.9)	207(6.6)	15(1.2)	213(4.4)	48(1.9) *	211(2.3)
		1984	34(2.2)	198(3.4)	13(1.3)	206(4.6)	14(1.1)	205(5.2)	40(2.2)	208(2.6)
	8	1996	22(1.0) *	255(3.3)	17(1.1)	263(3.1)	25(1.2) *	265(2.3)	36(1.5)	266(2.0)
		1984	33(2.0)	266(3.6)	17(1.9)	266(2.9)	19(1.5)	271(3.8)	31(2.5)	267(4.3)
	11	1996	16(1.4) *	274(4.1)	14(0.9)	276(2.9)	29(1.4)	286(3.4)	41(1.5) *	286(2.5)
		1984	25(1.8)	286(3.4)	14(1.9)	285(5.6)	29(2.0)	294(4.1)	32(2.1)	293(4.3)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Availability and Use of Computers

As educators explore the benefits of word processing and computer-delivered writing instruction, access to and use of computers becomes a key issue in the nation's schools.[20] Tables 8.5 and 8.6 present students' responses to questions about the availability and use of computers at school and at home.

As indicated in Table 8.5, there has been a dramatic increase since 1984 in the use of computers in schools. In 1984, the majority of students reported never using computers at school: 61 percent of fourth graders, 67 percent of eighth graders, and 55 percent of eleventh graders. In 1996, these percentages had decreased to only 11 percent of fourth graders, 23 percent of eighth graders, and 16 percent of eleventh graders. Based on 1996 average scores, there was no apparent relationship between frequency of computer use and writing performance.

Table 8.5 Computer Use in School at Grades 4, 8, and 11, 1984 and 1996

Students' Reports on How Often They Use a Computer at School		Grade 4		Grade 8		Grade 11	
		Percent of Students	**Average Scale Score**	**Percent of Students**	**Average Scale Score**	**Percent of Students**	**Average Scale Score**
Every day	1996	10(1.3) *	202(6.6)	17(1.8) *	263(4.2)	18(1.9)	284(5.5)
	1984	3(1.3)	***(***)	4(1.5)	***(***)	12(2.0)	***(***)
Two or three times a week	1996	27(3.3) *	209(4.4)	16(1.8) *	261(4.7)	17(1.8) *	284(3.5)
	1984	8(1.7)	***(***)	5(1.9)	***(***)	6(1.3)	***(***)
Once a week	1996	36(2.5) *	210(4.7)	15(1.8)	266(4.0)	15(1.5) *	282(5.8)
	1984	16(3.1)	***(***)	8(2.8)	***(***)	6(1.5)	***(***)
Less than once a week	1996	16(2.1)	202(3.5)	29(2.5) *	269(2.6)	34(1.6) *	289(4.1)
	1984	13(1.8)	***(***)	17(3.6)	***(***)	21(2.6)	***(***)
Never	1996	11(1.9) *	204(8.3)	23(2.7) *	263(5.8)	16(1.8) *	286(4.6)
	1984	61(3.5)	199(4.3)	67(4.2)	260(6.2)	55(2.9)	289(3.6)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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[20] Joram, E., Woodruff, E., Bryson, M., and Lindsay, P. (1992). The effects of revising with a word processor on written composition. *Research in the Teaching of English, 26*, 167-193.

Owston, R., Murphy, S., & Wideman, H. (1992). The effects of word processing on students' writing quality and revision strategies. *Research in the Teaching of English, 26*, 249-276.

Schramm, R. M. (1991). The effects of using word processing equipment in writing instruction. *Business Education Forum, 45*(5), 7-11.

As shown in Table 8.6, between 1984 and 1996 the increase in computer use for various purposes and in different contexts is striking at all three grades. For example, in 1984 less than one-fourth of the students in each grade reported ever using a computer to write stories or papers. By 1996 the percentages of students who reported using a computer for this purpose increased to 79 percent among fourth graders, 91 percent among eighth graders, and 96 percent among eleventh graders. Use of computers to learn things, and use of computers in the home and library, increased for students in each grade. There was also an increase in the percentage of eleventh graders who reported using a computer at a friend's house, and in the percentages of fourth and eleventh graders who reported using computers to play games. These results clearly indicate that computers have become an increasingly familiar technological tool in students' lives both in and out of school.

In 1996, eighth and eleventh graders who reported using a computer at home had higher average writing scores than their peers who did not report doing so. Fourth and eighth graders who reported using a computer at a friend's house or using a computer to play games had higher average writing scores than their peers who reported not doing so. Among eighth graders, use of computers to learn things and to write stories or papers was also associated with higher average writing scores.

Table 8.6

Use of Computers at Grades 4, 8, and 11, 1984 and 1996

Students' Reports on Computer Use		Year	Grade 4		Grade 8		Grade 11	
			Percent of Students	**Average Scale Score**	**Percent of Students**	**Average Scale Score**	**Percent of Students**	**Average Scale Score**
Use computer at home	Yes	1996	63(2.2) *	209(2.6)	61(2.5) *	271(2.2)	63(2.8) *	293(2.2)
		1984	45(3.7)	203(4.5)	37(4.6)	***(***)	30(2.9)	295(3.6)
	No	1996	37(2.2) *	208(2.9)	39(2.5) *	257(3.5)	37(2.8) *	276(3.5) *
		1984	55(3.7)	202(3.9)	63(4.6)	262(6.2)	70(2.9)	289(3.0)
Use computer at library	Yes	1996	61(3.1) *	207(3.3)	67(2.9) *	266(2.4)	73(2.5) *	286(3.2)
		1984	25(3.8)	***(***)	21(3.9)	***(***)	22(2.9)	***(***)
	No	1996	39(3.1) *	208(2.7)	33(2.9) *	262(4.7)	27(2.5) *	284(4.2)
		1984	75(3.8)	203(3.1)	80(3.9)	264(6.2)	78(2.9)	291(2.9)
Use computer at friend's house	Yes	1996	50(1.9)	212(2.2)	53(2.1)	271(3.5)	54(2.5) *	288(3.2)
		1984	39(4.5)	205(5.3)	43(5.1)	***(***)	32(2.9)	290(4.1)
	No	1996	50(1.9)	205(2.7)	47(2.1)	259(2.3)	46(2.5) *	285(3.1)
		1984	61(4.5)	202(3.6)	57(5.1)	264(6.7)	68(2.9)	290(3.2)
Use computer to learn things	Yes	1996	88(1.4) *	208(2.4)	83(1.8) *	267(2.1)	80(1.4) *	287(2.3)
		1984	68(3.1)	204(3.0)	58(4.5)	268(4.7)	55(3.0)	292(2.9)
	No	1996	13(1.4) *	215(4.7)	17(1.8) *	256(4.5)	20(1.4) *	281(5.5)
		1984	32(3.1)	200(5.3)	42(4.5)	***(***)	45(3.0)	290(4.2)
Use computer to play games	Yes	1996	90(1.3) *	209(1.9)	89(1.6)	267(1.8)	84(1.6) *	287(2.0)
		1984	72(3.7)	204(3.4)	84(3.7)	264(4.2)	76(2.5)	292(2.7)
	No	1996	10(1.3) *	197(5.7)	11(1.6)	252(6.1)	16(1.6) *	282(5.5)
		1984	28(3.7)	202(5.1)	16(3.7)	***(***)	24(2.5)	288(4.6)
Use computer to write stories or papers	Yes	1996	79(1.9) *	210(2.0)	91(1.2) *	268(1.9)	96(1.1) *	287(2.2)
		1984	23(3.7)	***(***)	15(3.5)	***(***)	19(2.2)	***(***)
	No	1996	21(1.9) *	203(4.9)	9(1.2) *	241(8.0)	4(1.1) *	***(***)
		1984	77(3.7)	206(2.3)	85(3.5)	261(5.7)	81(2.2)	291(3.0)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Writing Activities Outside of School

One important factor in students' development as writers is the frequency and diversity of their writing activities outside of school. Students were asked a set of questions about the uses of writing in their lives, including such personal uses as writing letters to friends or relatives, and more functional uses like writing notes and messages. Table 8.7 presents students' responses to questions asked at all three grades. Students in grades 8 and 11 were asked more detailed questions about their personal and social uses of writing; their responses are presented in Table 8.8.

Between 1984 and 1996 there were no statistically significant changes in fourth graders' reports about their engagement in various writing activities. At the eighth and eleventh grades, however, some changes were observed. At grade 8, there was an increase from 1984 to 1996 in the percentage of students who reported writing letters to friends or relatives at least once a week and a decrease in the percentage who reported doing so once or twice a month. At grade 11, there was decline between 1984 and 1996 in the percentage of students who reported never or hardly ever writing notes and messages. The reports of eighth and eleventh graders also indicated increased writing of stories or poems not assigned as schoolwork.

In 1996, eighth- and eleventh-grade students who reported writing notes and messages at least once a week had higher average writing scores than students who reported doing so less often. At grade 8, students who reported never or hardly ever writing letters to friends or relatives had lower average writing scores than students who reported doing so more frequently.

Table 8.7

Personal and Social Uses of Writing at Grades 4, 8, and 11, 1984 and 1996

Students' Reports on How Often They Engaged in Various Kinds of Writing Activities	Grade	Year	At Least Once a Week		Once or Twice a Month		Never or Hardly Ever	
			Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Write letters to friends or relatives	4	1996	35(1.3)	205(3.3)	35(1.2)	214(2.5)	30(1.2)	205(2.4)
		1984	33(2.1)	200(3.1)	37(2.1)	211(3.1)	31(1.6)	199(3.5)
	8	1996	46(2.0) *	269(1.8)	29(1.7) *	269(2.8)	25(1.3)	253(2.1)
		1984	37(2.0)	270(2.4)	37(2.0)	269(3.2)	26(1.5)	261(3.4)
	11	1996	36(1.5)	284(2.2) *	35(1.9)	284(2.6)	29(1.7)	278(2.7) *
		1984	36(1.8)	294(2.7)	38(1.9)	292(2.8)	26(2.1)	289(2.7)
Write notes and messages	4	1996	43(1.4)	211(2.2)	20(1.0)	210(2.6)	37(1.4)	203(2.4)
		1984	44(2.4)	205(3.4)	21(2.2)	202(4.2)	35(2.2)	203(3.1)
	8	1996	72(1.7)	271(1.6)	11(1.2)	255(3.5)	17(1.1)	246(2.6)
		1984	68(2.0)	271(2.5)	12(1.4)	263(4.9)	20(1.8)	256(4.4)
	11	1996	77(1.8)	286(1.8) *	14(1.5)	276(3.7)	10(1.1) *	265(4.9) *
		1984	74(1.9)	295(2.0)	11(1.2)	284(3.8)	15(1.4)	284(4.0)
Write stories or poems that are not schoolwork	4	1996	27(1.4)	204(3.0)	21(1.1)	213(2.9)	52(1.4)	208(2.0)
		1984	26(1.8)	197(4.5)	23(1.7)	208(5.1)	51(2.7)	206(2.6)
	8	1996	19(1.1) *	263(3.4)	22(1.3)	271(3.0)	60(1.7) *	263(1.6)
		1984	10(1.0)	266(5.7)	18(1.2)	271(3.8)	71(1.6)	266(2.6)
	11	1996	19(1.3) *	283(2.4)	22(1.4)	284(3.7)	59(1.6) *	281(2.1) *
		1984	12(1.1)	290(3.8)	18(1.8)	293(3.6)	71(1.4)	292(2.0)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

According to the results presented in Table 8.8, there was a decrease between 1984 and 1996 in the percentage of eighth-grade students who reported never or hardly ever making lists of things to buy or do. At grades 8 and 11, diary or journal writing was more frequent in 1996 than in 1984. At both grades, there was an increase in the percentage of students who reported keeping diaries or journals at least once a week. And at grade 11, the percentage of students who reported never or hardly ever keeping a diary or journal decreased between 1984 and 1996.

In 1996, eighth- and eleventh-grade students who reported making lists of things to buy or do at least once a week had higher average writing scores than students who reported never or hardly ever doing so. Similarly, eighth and eleventh graders who reported keeping a diary or journal at least once a week had higher average writing scores than students who reported never or hardly ever engaging in this type of writing activity.

Table 8.8

Personal and Social Uses of Writing at Grades 8 and 11, 1984 and 1996

Students' Reports on How Often They Engaged in Various Kinds of Writing Activities	Grade	Year	At Least Once a Week		Once or Twice a Month		Never or Hardly Ever	
			Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Make lists of things to buy or do	8	1996	48(1.6)	264(2.2)	24(1.7)	265(2.8)	28(1.2) *	255(2.3)
		1984	44(2.4)	267(2.5)	21(1.9)	274(3.7)	35(2.0)	263(3.6)
	11	1996	48(1.5)	288(2.0)	24(1.2)	281(2.4)	29(1.3)	276(2.9)
		1984	46(2.3)	290(2.3)	24(2.1)	291(3.1)	31(2.6)	281(3.8)
Copy recipes or directions	8	1996	24(1.3)	259(3.1)	29(1.4)	269(2.4)	47(1.4)	259(1.7)
		1984	22(1.9)	266(3.5)	29(1.5)	270(2.8)	50(2.6)	266(2.9)
	11	1996	19(1.2)	286(3.3)	33(1.5)	286(2.1)	48(1.7)	280(2.1)
		1984	20(1.8)	286(3.8)	33(2.0)	292(3.5)	47(2.4)	284(3.4)
Keep a diary or journal	8	1996	31(1.2) *	269(3.7)	12(0.9)	268(3.8)	57(1.3)	257(2.1)
		1984	26(1.8)	270(3.0)	12(1.0)	270(3.7)	62(2.2)	266(2.8)
	11	1996	24(1.5) *	289(3.1)	14(1.1)	286(3.9)	62(1.5) *	280(1.8)
		1984	19(1.4)	291(4.3)	13(1.3)	287(3.9)	68(1.5)	286(2.4)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Students were also asked about the frequency of different types of writing activities within their families. The responses of students to a selection of these questions in 1984 and 1996 are presented in Table 8.9. The results are somewhat mixed, indicating that some activities were occurring more frequently in 1996 than in 1984, while the reverse was true for other activities.

Between 1984 and 1996, there was an increase in the percentage of eighth graders who reported that their families wrote notes or messages at least once a week. Correspondingly, there was a decrease in the percentage of students who reported that this activity never or hardly ever occurred in their families. Similar results were observed in fourth graders' reports about the frequency of keeping diaries or journals in their families: between 1984 and 1996 there was an increase in the percentage who reported that this activity occurred at least once a week. However, there was also an increase in the percentage of fourth graders who reported that keeping diaries or journals never or hardly ever occurred in their families. These mixed results may be due, in part, to a decrease in the percentage of students who responded "I don't know" to this question.

The only other significant change in the frequency of writing activities in students' families was in eleventh graders' reports about writing letters to relatives or friends. Between 1984 and 1996 there was a decrease in the percentage of students who reported this activity occurred in their families at least once a week, and an increase in the percentage of students who reported this activity never or hardly ever occurred.

At grades 8 and 11 in 1996, students who reported that their families wrote notes and messages at least once a week, or made lists of things to buy or do at least once a week, had higher average writing scores than their peers who reported that their families never or hardly ever engaged in these writing activities.

Table 8.9

Family Uses of Writing at Grades 4, 8 and 11, 1984 and 1996

Students' Reports on How Often Their Families Engaged in Various Kinds of Writing Activities			At Least Once a Week		Once or Twice a Month		Never or Hardly Ever		I Don't Know	
	Grade	Year	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score
Write notes or messages	4	1996	45(1.5)	211(2.7)	16(1.1)	212(3.6)	24(1.1)	204(2.9)	16(1.0)	202(4.7)
		1984	42(2.3)	205(3.7)	18(2.2)	205(5.3)	26(2.0)	203(3.9)	15(1.6)	201(4.1)
	8	1996	68(1.3) *	271(1.9)	13(0.7)	257(2.9)	13(0.9) *	254(3.8)	7(0.6)	242(6.6)
		1984	59(2.2)	273(2.2)	13(1.3)	266(4.6)	21(1.7)	256(4.3)	7(0.9)	***(***)
	11	1996	73(1.6)	287(1.9) *	10(1.0)	277(3.6)	14(1.0)	269(3.5)	4(0.7)	***(***)
		1984	74(1.9)	296(2.0)	8(1.1)	***(***)	14(1.5)	280(3.4)	5(1.0)	***(***)
Make lists of things to buy or do	4	1996	62(1.4)	209(3.3)	12(1.0)	209(5.0)	15(1.1)	208(3.9)	11(0.8) *	198(3.5)
		1984	58(2.2)	205(2.4)	13(1.4)	206(6.3)	13(1.4)	206(4.6)	17(1.8)	197(5.1)
	8	1996	65(1.4)	266(1.5)	12(0.7)	265(3.1)	17(1.1)	255(2.4)	6(0.5)	243(5.9)
		1984	63(1.9)	271(2.1)	10(1.8)	***(***)	21(1.9)	262(3.9)	6(1.5)	***(***)
	11	1996	67(1.2)	286(1.8)	12(0.7)	282(3.5)	17(1.1)	270(3.3) *	5(0.6)	***(***)
		1984	70(2.2)	293(2.5)	13(1.8)	284(5.5)	13(1.7)	284(4.6)	3(0.8)	***(***)
Write letters to relatives or friends	4	1996	31(1.4)	206(3.7)	33(1.0)	213(3.1)	24(0.9)	205(2.6)	12(0.8)	203(4.8)
		1984	34(2.3)	202(3.3)	30(2.3)	210(3.5)	23(2.6)	201(4.8)	12(1.5)	202(4.7)
	8	1996	34(1.3)	268(1.7)	37(1.6)	267(2.7)	22(1.1)	263(2.4)	8(1.1)	246(5.4)
		1984	35(2.1)	271(2.5)	39(2.4)	269(3.2)	20(2.1)	263(4.2)	7(1.0)	***(***)
	11	1996	25(1.3) *	284(3.0)	39(1.4)	286(2.8)	29(1.4) *	278(3.4)	7(0.7)	271(8.5)
		1984	36(2.4)	295(3.0)	39(1.9)	293(2.8)	20(1.6)	287(2.9)	5(1.1)	***(***)
Keep diaries or journals	4	1996	37(1.9) *	206(3.1)	8(0.9)	203(5.2)	36(1.6) *	211(2.6)	20(1.4) *	204(4.6)
		1984	26(1.9)	203(2.5)	10(1.2)	***(***)	29(1.4)	211(3.8)	36(1.9)	201(3.1)
	8	1996	25(1.4)	267(2.7)	7(0.6)	272(4.2)	46(1.8)	263(1.8)	22(1.1)	256(3.0)
		1984	22(1.7)	269(3.7)	5(1.1)	***(***)	50(1.8)	268(2.5)	23(1.8)	261(4.4)
	11	1996	20(1.9)	288(3.3)	8(0.8)	283(6.6)	49(1.9)	283(1.9)	24(1.5)	277(3.0)
		1984	18(2.5)	291(4.7)	7(1.4)	***(***)	56(3.1)	290(2.8)	20(2.2)	289(3.4)

Standard errors of the estimated percentages and scale scores appear in parentheses.

* Indicates that the percentage or average scale score in 1996 is significantly different than that in 1984.

*** Sample size is insufficient to permit a reliable estimate.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Summary

- Several significant changes between 1984 and 1996 in the types of writing students did in their English classes were indicated by students' reports. At all three grades, students reported more frequent writing of essays, compositions, or themes in 1996 than in 1984. Fourth and eighth graders reported more frequent writing of stories in 1996 than in 1984. At grades 8 and 11, letters, poems, and reports other than book reports were reported to be written more frequently in 1996 than in 1984.
- In 1996, the reports of eighth and eleventh graders about teacher comments on completed papers indicated that their teachers commented on the ideas in student papers and the way feelings were expressed more frequently than did the teachers of students in 1984. An increase between 1984 and 1996 was also indicated by eighth graders' reports in the frequency of teacher comments about the way ideas are explained.
- Between 1984 and 1996, fourth graders' reports indicated a decrease in the frequency with which teachers marked mistakes on students' writing. At grade 8, students' reports indicated an increase in the frequency with which teachers wrote notes on students' writing or pointed out what was well done.
- Compared to the reports of students in 1984, fourth graders in 1996 reported more frequent use of the following revising and editing strategies: correcting grammar, changing words, and taking out parts that are not liked. Eighth graders' reports in 1996 indicated more frequent use of moving sentences or paragraphs as a strategy. According to the reports of students in all three grades, throwing out and starting over was less frequently used as strategy in 1996 than in 1984.
- Between 1984 and 1996, there has been a striking increase in students' use of computers in school and at home. The percentages of fourth, eighth, and eleventh graders who reported never using a computer at school decreased from 61 percent, 67 percent, and 55 percent in 1984 to only 11 percent, 23 percent and 16 percent in 1996. At all three grades, students' use of computers at home, at the library, to learn things, and to write stories or papers has increased since 1984. In addition, a greater percentage of fourth and eleventh graders reported playing games on computers, and a greater percentage of eleventh graders reported using a computer at a friend's house.
- Between 1984 and 1996, there were no significant changes in fourth graders' reports about their engagement in various types of writing outside of school. At grades 8 and 11, however, students' reports indicated an increase in writing stories or poems that were not assigned as schoolwork and in keeping a diary or journal. Also, eighth graders reported more frequent writing of letters to friends or relatives and making lists of things to buy or do, and eleventh graders reported more frequent writing of notes and messages.
- Students' reports on their families' use of writing indicated some increases and decreases between 1984 and 1996. At grade 8, students reported more frequent writing of notes or messages by their families in 1996 than in 1984. However, eleventh graders in 1996 reported less frequent writing of letters to relatives or friends than did their counterparts in 1984.

Procedural Appendix

Overview of Procedures Used in the 1996 NAEP Trend Assessments

This appendix provides information about the methods and procedures used in NAEP's 1996 science, mathematics, reading, and writing trend assessments. The *NAEP 1996 Technical Report* contains more extensive information about these procedures.

This NAEP trend report is based on results from nine science assessments, eight mathematics assessments, nine reading assessments, and six writing assessments, with the most recent assessment in each of the four curriculum areas having been conducted during the 1995-96 school year. NAEP also conducted various cross-sectional (or "main") assessments and state assessments in 1996. In addition, "main" assessments separate from the trend assessment have occurred in each of the four curriculum areas during the late 1980s and early 1990s. These "main" assessments measured somewhat different aspects of the content areas than the trend assessments that were administered during those years. In some cases, the main assessments have been administered in more than one year, and results from the different administrations have been compared to one another, providing short-term trend comparisons.[1] These short-term trend comparisons were based on different frameworks and content specifications from those used for the long-term trend assessments. For each of the four curriculum areas, the long-term trend comparisons described in this report are based on content specifications for the four curriculum areas that were essentially constant over the six to nine assessments described in this report. In fact, the trend assessment booklets used in 1996 were also used in the past few long-term trend assessments. Questions that were common to several assessments before the mid-1980s were included in these current assessment booklets. More information about the composition of each of the trend assessments is presented below.

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[1] Reese, C. M., Miller, K. E., Mazzeo, J. & Dossey, J. A. (1997). *NAEP 1996 mathematics report card for the nation and the states*. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Campbell, J. R., Donahue, P. L. Reese, C. M. & Phillips, G. W. (1996). *NAEP 1994 reading report card for the nation and the states*. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Science

NAEP conducted trend assessments of the science achievement of in-school 9-, 13-, and 17-years-olds during the school years ending in 1970, 1973, 1977, 1982, 1986, 1990, 1992, 1994, and 1996. In the first assessment, the 17-year-olds were assessed during the spring of the school year ending in 1969, rather than 1970. For each of the other assessments, 13-year-olds were assessed in the fall, 9-year-olds were assessed in the winter, and 17-year-olds were assessed in the spring of the assessment school year. Identical assessment booklets, containing blocks of science, math, and background questions, were used in 1986, 1990, 1992, 1994, and 1996. The assessments were administered using an audiotape that guided the students through the assessment questions. The use of audiotape minimized the dependence of the science results on reading ability.

The science trend assessments measured student achievement based on assessment objectives developed by nationally representative panels of scientists, science educators, and concerned citizens. The objectives which formed the basis for the 1986, 1990, 1992, 1994, and 1996 trend assessments[2] replicated the objectives used in previous assessments. The objectives for each assessment prior to 1986 were based on the framework used for the previous assessment with some revisions that reflected changes in content and trends in school science. That is, the objectives for assessments prior to 1986 were not identical from assessment to assessment. Since 1986, the objectives have been identical from assessment to assessment. Although changes were made in the content of the assessment before 1990, some questions were retained from one assessment to the next in order to measure trends in achievement across time. This allows comparisons across all of the available assessments to be made. All of the trend assessments from 1977 onward contained enough common questions to put the results from these assessments on the same scale using item response theory (IRT) scaling. The 1970 and 1973 assessments had too few questions in common with subsequent assessments to have results put directly on the IRT scale; results from these assessments were placed on the trend scale using mean proportion correct for the common questions. (This is the reason that the data points from 1970 and 1973 presented in figures in this report are connected to data points from the other years using dashed lines, rather than solid lines.)

The 1996 science trend assessment contained 63 multiple-choice questions at age 9, 83 multiple-choice questions at age 13, and 82 multiple-choice questions at age 17. The assessment covered a range of science content areas, including topics from the life sciences, physical sciences, and earth and space sciences. Questions assessed students' abilities to understand basic scientific facts and principles, solve problems in scientific contexts, design experiments, interpret data and read tables and graphs, and understand the nature of science.

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[2] National Assessment of Educational Progress (1986). *Science objectives: 1985-86 assessment.* Princeton, NJ: Educational Testing Service.

Mathematics

NAEP has assessed the mathematics achievement of in-school 9-, 13-, and 17-year-olds eight times: in the school years ending in 1973, 1978, 1982, 1986, 1990, 1992, 1994, and 1996. The trend assessment, which forms the basis of the results detailed in this report, uses procedures established in 1973. The assessments were presented in paced-tape administrations, and for each of the assessments, 13-year-olds were assessed in the fall, 9-year-olds were assessed in the winter, and 17-year-olds were assessed in the spring of the assessment school year. The same assessment booklets were used in 1986, 1990, 1992, 1994, and 1996; these booklets contained blocks of mathematics questions and blocks of science questions, as well as background questions.

The mathematics trend assessments contained a range of constructed-response and multiple-choice questions measuring performance on sets of objectives developed by nationally representative panels of mathematics specialists, educators, and other interested parties. The 1986, 1990, 1992, 1994, and 1996 assessments shared common objectives.[3] The objectives for each assessment prior to 1990 were based on the framework used for the previous assessment with some revisions that reflected changes in the contents of mathematics education. Although changes were made from assessment to assessment before 1990, some questions were retained from one assessment to the next in order to measure trends in achievement across time. This allows comparisons across all of the available assessments, other than the 1973 assessment, to be made using IRT. Results from the 1973 assessment were placed on the same scale using mean proportion correct extrapolation.

The 1986, 1990, 1992, 1994, and 1996 mathematics trend assessments included 71 questions, including 28 constructed-response questions at age 9; 127 questions, including 27 constructed-response questions, at age 13; and 132 questions, including 29 constructed-response questions at age 17. The questions covered a range of content, including numbers and operations, measurement, geometry, and algebra. The process areas include knowledge, understanding, skills, applications, and problem solving.

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[3] National Assessment of Educational Progress (1986). *Math objectives: 1985-86 assessment.* Princeton, NJ: Educational Testing Service.

Reading

NAEP has assessed students' reading performance at age 9 or in grade 4, at age 13 or in grade 8, and at age 17 or in grade 11 in nine reading assessments conducted during the school years ending 1971, 1975, 1980, 1984, 1988, 1990, 1992, 1994, and 1996. For each assessment, 13-year-olds and eighth graders were assessed in the fall, 9-year-olds and fourth graders were assessed in the winter, and 17-year-olds and eleventh graders were assessed in the spring of the assessment school year. Because data from both the age samples and the grade samples were used to establish the reading trend scale in 1986 when scaling of the trend assessments was first done, this practice has been replicated in all subsequent trend assesments. Results reported in this document, however, are results for the 9-, 13-, and 17-year-olds assessed each year. The same assessment booklets, containing blocks of reading, writing, and background questions, were used in 1984, 1988, 1990, 1992, 1994, and 1996. The assessments since 1984 were administered in printed form; previous to that time the assessments were paced using audiotapes. In 1984, the assessment was administered in both modes.

The reading tasks required students to read and answer questions based on a variety of materials, including informational passages, literary text, and documents. Although some tasks required students to provide written responses, most questions were multiple-choice questions. The assessment was designed to evaluate students' ability to locate specific information, make inferences based on information in two or more parts of a passage, or identify the main idea in a passage. For the most part, these questions measured students' ability to read either for specific information or for general understanding. Although the reading assessments conducted through the 1970s underwent some changes from test administration to administration, the set of reading passages and questions included in the trend assessments has been kept essentially the same since 1984, and most closely reflects the objectives developed for that assessment.[4] The reading trend assessment administered at age 9/grade 4 included 45 passages and 105 questions, including eight that required students to construct written responses. At age 13/grade 8, the assessment included 43 passages and 107 questions, seven of them requiring constructed responses. At age 17/grade 11, the assessment contained 36 passages and 95 questions, eight of them requiring constructed responses.

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[4] National Assessment of Educational Progress (1984). *Reading objectives: 1983-84 assessment*. Princeton, NJ: Educational Testing Service.

Writing

NAEP has assessed the writing performance of students in grades 4, 8, and 11 and at ages 9, 13, and 17 in the school years ending in 1984, 1988, 1990, 1992, 1994, and 1996. In all six assessments the same prompts were administered in the same manner to comparable samples of students. As for reading, 13-year-olds and eighth graders were assessed in the fall, 9-year-olds and fourth graders were assessed in the winter, and 17-year-olds and eleventh graders were assessed in the spring of the assessment school year. Data from both the age samples and the grade samples for all assessment years were used to establish the writing trend scale. Results reported in this document, however, are results for the fourth, eighth, and eleventh graders. The same assessment booklets, containing blocks of reading, writing, and background questions, were used in all of the assessment years. The writing trend assessments were administered in print.

The primary objective of the trend assessment was to measure students' ability to write for various purposes; related objectives were to evaluate the extent to which students managed the writing process, controlled the forms of written language, and valued writing.[5] At each age/grade, six different writing prompts were administered and each student received at least one prompt.

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[5] National Assessment of Educational Progress (1987). *Writing objectives: 1988 assessment.* Princeton, NJ: Educational Testing Service.

The Design of the Science and Mathematics Trend Assessments

At each of the three ages assessed, both the science and mathematics trend assessments consisted of three different 15-minute segments or "blocks" of content questions. Each also contained a small set of background questions that pertained to students' experiences and instruction related to the particular subject area being assessed (i.e., either science or mathematics).

The blocks were assembled three to a booklet, together with a general background questionnaire that was common to all booklets. This questionnaire included questions about demographic information as well as home environment.

At ages 9 and 13, the blocks were placed in three booklets, each containing one block of mathematics questions, one block of science questions, and one block of reading questions. The reading block in these booklets is not used in the reading trend assessment, but is included in order to preserve the context of the science and mathematics questions. To replicate procedures established in 1986, at age 17, two booklets were administered. One contained two mathematics blocks and one science block, while the other contained two science blocks and one mathematics block.

At all three ages, the science and mathematics questions were administered using a paced audiotape. The tape recording that accompanied the booklets standardized timing and was intended to help students with any difficulty they might have in reading the questions. Thus, in an administration session, all students were being paced through the same booklet.

The Design of the Reading and Writing Trend Assessments

The reading trend assessment consisted of ten 15-minute blocks of reading passages and questions at each of the three age/grade levels, while the writing trend assessment included five 15-minute blocks. Each writing block contained one prompt, except one block which contained two short prompts, for a total of six writing prompts. In addition, each content block contained a short set of background questions. The background questions in the reading blocks pertained to students' reading habits and experiences, while those in the writing blocks asked about students' writing practices, instruction, and attitudes.

In keeping with procedures established with the 1984 reading and writing trend assessments, the reading and writing blocks were assembled into six booklets at each age/grade assessed. Each student participating in the reading and writing assessments received a booklet containing three content blocks as well as a six-minute section of general background questions about demographic information and the students' home environment.

Sampling and Data Collection

Sampling and data collection activities for the 1996 trend assessments were conducted by Westat, Inc. Based on procedures used since the inception of NAEP, the data collection schedule was 13-year-olds/eighth graders in the fall (October to December, 1995), 9-year-olds/fourth graders in the winter (January to mid-March, 1996), and 17-year-olds/eleventh graders in the spring (mid-March to May, 1996). Although only 9-, 13-, and 17-year-olds were assessed in science and mathematics, both age- and grade-eligible students were assessed in reading and writing. Age eligibility was defined by calendar year for 9- and 13-year olds, while the birth date range for 17-year-olds was from October, 1978 through September 30, 1979.

As with all NAEP national assessments, students attending both public and nonpublic schools were selected for participation based on a stratified, three-stage sampling plan. The first stage included defining geographic primary sampling units (PSUs), which are typically groups of contiguous counties, but sometimes a single county; classifying the PSUs into strata defined by region and community type; then selecting PSUs with probability proportinal to size. In the second stage, both public and nonpublic schools are selected within each PSU that was selected at the first stage. The third stage involved randomly selecting students within a school for participation. A small number of students selected for participation were excluded because of limited English proficiency or severe disability.

The student sample sizes for the trend assessments as well as the school and student participation rates are presented in the following tables. The numbers in the tables are based on the full age/grade samples of students, when the age/grade samples were collected. Students within schools were randomly assigned to either mathematics/science or reading/writing assessment sessions subsequent to their selection for participation in the 1996 assessments. Student sample sizes appear in Tables P.1, P.3, P.5, and P.7. School and student participation rates are shown in Tables P.2, P.4, P.6, and P.8. These rates are included in individual tables for each subject area for convenience in comparing across assessment years, although the rates are common for the math and science samples and for the reading and writing samples for many assessment years. For assessments conducted prior to 1984, the school and student participation rates were obtained from the Public Use Data Tape User Guides. Figures for more recent assessments were obtained from the reports on the NAEP field operation and data collection activities, prepared by Westat, Inc. Although sampled schools that refused to participate were replaced, school cooperation rates were computed based on the schools originally selected for participation in the assessments. The student participation rates represent the percentage of students assessed of those invited to be assessed, including in follow-up sessions when necessary.

Table P.1 Student Sample Sizes for the Science Trend Scaling

	1977	1982	1986	1990	1992	1994	1996
Age 9	17,345	1,960	6,932	6,235	7,335	5,663	5,414
Age 13	25,653	7,873	6,200	6,649	5,909	6,052	5,658
Age 17 (in school)	31,436	7,974	3,868	4,411	4,359	3,813	3,539
TOTAL	74,434	17,817	17,000	17,295	17,603	15,528	14,611

Table P.2 School and Student Participation Rates for the Science Trend Assessments

	Age	Weighted Percentage of Schools Participating	Weighted Percentage of Students Participating
1970	9	–	88.0
	13	–	85.6
	17	–	74.5
1973	9	93.9	91.0
	13	93.8	84.6
	17	92.4	73.6
1977	9	91.5	88.6
	13	91.3	86.2
	17	89.5	73.1
1982	9	88.3	90.5
	13	89.2	85.5
	17	86.5	74.2
1986	9	88.7	92.9
	13	88.1	89.2
	17	82.7	78.9
1990	9	87.0	92.5
	13	89.0	90.2
	17	79.0	82.1
1992	9	87.8	94.4
	13	85.6	90.9
	17	81.0	82.3
1994	9	87.1	94.4
	13	80.4	92.3
	17	79.5	84.8
1996	9	82.6	95.4
	13	80.8	92.6
	17	75.6	84.1

Table P.3 Student Sample Sizes for the Mathematics Trend Scaling

	1978	1982	1986	1990	1992	1994	1996
Age 9	14,752	12,038	6,932	6,235	7,335	5,663	5,414
Age 13	24,209	15,758	6,200	6,649	5,909	6,052	5,658
Age 17 *(in school)*	26,756	16,319	3,868	4,411	4,359	3,813	3,539
TOTAL	65,717	44,115	17,000	17,295	17,603	15,528	14,611

Table P.4 School and Student Participation Rates for the Mathematics Trend Assessments

	Age	Weighted Percentage of Schools Participating	Weighted Percentage of Students Participating
1973	9	93.9	90.9
	13	93.8	84.2
	17	92.4	73.5
1978	9	91.5	87.2
	13	91.5	85.2
	17	89.5	73.2
1982	9	88.3	90.5
	13	89.2	85.5
	17	86.5	74.2
1986	9	88.7	92.9
	13	88.1	89.2
	17	82.7	78.9
1990	9	87.0	92.5
	13	89.0	90.2
	17	79.0	82.1
1992	9	87.8	94.4
	13	85.6	90.9
	17	81.0	82.3
1994	9	87.1	94.4
	13	80.4	92.3
	17	79.5	84.8
1996	9	82.6	95.4
	13	80.8	92.6
	17	75.6	84.1

Table P.5 Student Sample Sizes for the Reading Trend Scaling

	1971	1975	1980	1984	1988	1990	1992	1994	1996
Age 9	23,201	21,697	21,159	22,291	3,782	4,268	4,944	5,335	5,019
Age 13	25,545	21,393	22,530	22,693	4,005	4,609	3,965	5,547	5,493
Age 17 *(in school)*	23,661	19,624	18,103	25,193	3,652	4,383	4,447	4,840	4,669
TOTAL	72,407	62,714	61,592	70,177	11,439	13,260	13,356	15,722	15,181

Table P.6 School and Student Participation Rates for the Reading Trend Assessments

	Age	Weighted Percentage of Schools Participating	Weighted Percentage of Students Participating
1971	9	92.5	90.9
	13	92.0	84.2
	17	90.5	73.5
1975	9	93.9	87.2
	13	92.8	85.2
	17	91.0	73.2
1980	9	94.5	90.5
	13	93.2	85.5
	17	90.5	74.2
1984	9	88.6	92.9
	13	90.3	89.2
	17	83.9	78.9
1988	9	87.2	92.5
	13	92.7	90.2
	17	78.1	82.1
1990	9	87.0	92.5
	13	89.0	90.2
	17	79.0	82.1
1992	9	87.0	93.8
	13	85.3	90.8
	17	80.9	83.3
1994	9	86.7	94.1
	13	79.7	91.8
	17	80.1	84.2
1996	9	83.5	95.6
	13	82.0	92.2
	17	81.7	83.8

Table P.7 Sample Sizes for the Writing Trend Assessment by Task

	1984			1988			1990			1992			1994			1996		
	Grade			Grade			Grade			Grade			Grade			Grade		
Writing Task	**4**	**8**	**11**	**4**	**8**	**11**	**4**	**8**	**11**	**4**	**8**	**11**	**4**	**8**	**11**	**4**	**8**	**11**
Informative																		
Plants	656	–	–	1285	–	–	1416		–	1677	–	–	1347	–	–	1205	–	–
XYZ Company	544	616	–	1152	1334	–	1288	1489	–	1583	1333	–	1217	1313	–	1103	1357	–
Appleby House	530	588	599	925	1256	1041	1111	1396	1277	1337	1249	1264	1013	1255	1141	909	1250	1130
Food on the Frontier	–	603	629	–	1339	1212	–	1503	1401	–	1316	1447	–	1321	1305	–	1275	1151
Job Application	–	–	603	–	–	1169	–	–	1424	–	–	1403	–	–	1214	–	–	1183
Persuasive																		
Spaceship	611	–	–	1258		–	1367	–	–	1653	–	–	1313	–	–	1212	–	–
Radio Station	585	612	–	1234	1364	–	1386	1512	–	1650	1362	–	1303	1359	–	1200	1391	–
Dissecting Frogs	–	64T	–	–	1356	–	–	1518	–	–	1359	–	–	1331	–	–	1392	–
Rec. Opportunities	–	494	521	–	1372	1242	–	1498	1415	–	1317	1416	–	1301	1272	–	1315	1235
Space Program	–	–	632	–	–	1195	–	–	1451	–	–	1427	–	–	1276	–	–	1218
Bike Lane	–	–	636	–	–	1178	–	–	1424	–	–	1425	–	–	1282	–	–	1251
Imaginative																		
Flashlight	609	–	–	614	–	–	702	–	–	850	–	–	656	–	–	603	–	–
TOTAL	1601	1973	2037	3327	4133	3664	3642	4665	4385	4290	4103	4339	3409	4058	3948	3153	4150	3737

Table P.8

School and Student Participation Rates for the Writing Trend Assessments

	Grade	Weighted Percentage of Schools Participating	Weighted Percentage of Students Participating
1984	4	88.6	92.5
	8	90.3	90.3
	11	83.9	82.2
1988	4	87.2	92.3
	8	92.7	88.2
	11	78.1	77.4
1990	4	87.0	92.5
	8	89.0	90.2
	11	79.0	82.1
1992	4	87.0	93.8
	8	85.3	90.8
	11	80.9	83.3
1994	4	86.7	94.1
	8	79.7	91.8
	11	80.1	84.2
1996	4	83.5	95.6
	8	82.0	92.2
	11	81.7	83.8

Scoring the Booklets

Materials from NAEP 1996 assessments, including the trend assessments, were shipped to National Computer Systems (NCS) in Iowa City, Iowa, for processing. Receipt and quality control were managed through a sophisticated bar-coding and tracking system. After all appropriate materials were received from a school, they were forwarded to the professional scoring area, where the responses to constructed-response questions were evaluated by trained staff using guidelines prepared by NAEP. Each constructed-response question had a unique scoring guide that defined the criteria to be used in evaluating students' responses. Subsequent to the professional scoring, the booklets were scanned, and all information was transcribed to the NAEP database at ETS. Each processing activity was conducted with rigorous quality control. An overview of the professional scoring for mathematics, reading, and writing follows. (No constructed-response questions were scored for science.)

Scoring the Mathematics Constructed-Response Questions

Most of the constructed-response mathematics trend questions were scored on a correct/incorrect basis. The scoring guides identified the correct or acceptable answers for each question in each block. The scores for these questions included a 0 for no response, a 1 for a correct answer, or a 2 for an incorrect or "I don't know" response. Because of the straightforward nature of the scoring, lengthy training was not required. In an orientation period, the readers were trained to follow the procedures for scoring the mathematics questions and given an opportunity to become familiar with the scoring guides, which listed the correct answer for the questions in each of the blocks.

During the scoring, every tenth booklet in a session was scored by a second reader to provide a quality check. These quality checks were recorded on a separate sheet with the few discrepancies noted, and the scores were corrected. For the most part, the discrepancies were due to a score not being coded for a response to a question.

Scoring the Reading Constructed-Response Questions

The 1996 reading trend assessment included eight questions at age 9 for which students were required to construct written responses, seven such questions at age 13, and eight such questions at age 17. Some of the questions were administered to more than one age group of students.

The scoring guides for the constructed-response reading questions focused on students' ability to perform various reading tasks — for example, identifying the author's message or mood and substantiating their interpretations, making predictions based on given details, supporting an interpretation, and comparing and contrasting information.

The scoring guides for the reading questions varied somewhat, but typically included the distribution of score points shown below.

Outline for Scoring of Constructed-Response Reading Trend Assessment Question

Rating Category	
4	ELABORATED REFERENCE OR INTERPRETATION. **These responses exceeded the requirements of the task by including illustrative examples or details and demonstrating a high level of cohesiveness.**
3	SATISFACTORY REFERENCE OR INTERPRETATION. **These responses identified at least two relevant examples or reasons to support a given interpretation.**
2	MINIMAL REFERENCE OR INTERPRETATION. **These responses did not provide evidence to support a stated interpretation.**
1	UNSATISFACTORY REFERENCE OR INTERPRETATION. **These responses did not provide an interpretation, but instead digressed or avoided the task.**
0, 7, 8, 9	**These responses were, respectively, blank, indecipherable, completely off-task, or included a statement to the effect that the student did not know how to do the task. (In the analysis, scores of 7, 8, and 9 were collapsed into the score point of 9.)**

Some of the scoring guides included secondary scores, which typically involved categorizing the kind of evidence or details the student used as support for an interpretation. The document literacy tasks, most of which required short answers, were scored on a correct/incorrect basis.

The training program for the reading trend assessment scoring was carried out on all assessment questions one at a time for each age group and covered the range of student responses. Because the purpose of the scoring was to measure trends from the 1984 assessment, preparation for training included rereading hundreds of 1984 responses and compiling training sets. In order to ensure continuity with the past scoring of the trend questions, at least half of the sample papers in the training sets were taken from the 1984 training sets, and previously scored 1984 booklets were masked to ensure that scoring for training and the subsequent trend reliability scoring would be done without knowledge of the previous scores given.

The actual training was conducted by ETS staff assisted by NCS's scoring director and team leaders. Training began with each reader receiving a photocopied packet of materials consisting of a scoring guide, a set of 15 to 20 scored samples, and an additional 20 to 40 response samples to be scored. The trainers reviewed the scoring guide, explained all the applicable score points, and elaborated on the rationale used to arrive at a particular score. The readers then reviewed the 15 to 20 scored samples, as the trainers clarified and elaborated on the scoring guide. After this explanation, the additional samples were scored and discussed until the readers were in agreement. If necessary, additional packets of 1984 responses were used for practice scoring.

As a further step to achieve reliability with 1984, a 25 percent sample of the 1984 responses was scored on separate scoring sheets following the formal training session. These sheets were key entered, and a computerized report was generated comparing the new scores with those assigned in 1984. After some further discussion, scoring of the 1996 responses began. Three reliability studies were conducted as part of this scoring. For the 1996 material, 25 percent of the constructed responses were scored by a second reader to produce interreader reliability statistics. In addition, a trend reliability study was conducted by rereading 20 percent of the 1984 responses. Finally, a trend reliability study was conducted by rereading 20 percent of the 1994 responses. The reliability information from these studies is shown in Table P.9.

Table P.9 **Percent Exact Agreement Between Readers: Reading Trend Assessment Scoring**

	1984 Responses Rescored in 1996		1994 Responses Rescored in 1996		1996 Responses Scored Twice	
	Mean Percent Agreement	Range of Agreement	Mean Percent Agreement	Range of Agreement	Mean Percent Agreement	Range of Agreement
Age 9	87.6	83.3-93.4	90.6	87.9-91.9	92.1	87.0-95.1
Age 13	85.5	83.0-89.7	70.7	64.8-75.1	89.9	86.7-93.9
Age 17	83.3	74.4-87.7	79.2	74.5-83.8	89.5	82.8-95.2

Note: The reading scoring was generally based on 5 scoring categories.

Primary Trait Scoring of the Writing Tasks

A primary trait scoring guide was developed for each writing task to focus raters' attention on how successfully students' responses accomplished the task set forth in the prompt. As illustrated in the introduction to Part IV of this report, the scoring guides typically defined five levels of task accomplishment — not rated, unsatisfactory, minimal, adequate, and elaborated — based on the rhetorical demands of the task. (A few of the scoring guides did not define an "elaborated" category as it was not appropriate to do so given the nature of the task.)

Because the results for the 1984 and 1988 writing trend assessments were based on a 1988 scoring of both 1984 and 1988 papers, the undertaking for writing trend scoring in 1990, 1992, 1994, and 1996 involved replicating the standards used in 1988. The procedure for training readers proceeded as outlined above for the reading trend assessment scoring, except that the writing scorers were trained using 1988 sample papers and practiced with a 25 percent sample of 1988 responses. As part of the scoring, three reliability studies were conducted. For the 1996 responses, 25 percent of the papers were scored by a second reader to produce interrater reliability statistics. In addition, a trend reliability study was conducted to ensure that the scoring procedures were consistent with those used in 1988. Finally, a trend reliability study was conducted to examine the consistency of 1996 scoring procedures with 1994 procedures. The results of these studies are presented in Table P.10.

Table P.10 Percent Exact Agreement Between Readers for Primary Trait Scoring: Writing Trend Assessment Scoring

	1988 Responses Rescored in 1996		1994 Responses Rescored in 1996		1996 Responses Scored Twice	
	Mean Percent Agreement	Range of Agreement	Mean Percent Agreement	Range of Agreement	Mean Percent Agreement	Range of Agreement
Grade 4	91.3	85.9-93.9	90.2	84.1-96.2	94.9	92.9-97.4
Grade 8	90.0	85.8-96.0	74.2	61.7-89.2	93.0	89.3-97.3
Grade 12	84.9	81.8-89.6	77.5	73.7-82.1	90.6	86.1-93.2

Note: The primary trait scoring was based on 5 scoring categories.

Data Analysis and IRT Scaling

After the assessment information had been compiled in the NAEP database, the data were weighted according to the sample design and the population structure. The weighting for the samples reflected the probability of selection for each student as a result of the sampling design, adjusted for nonresponse. Through poststratification, the weighting assured that the representation of certain subpopulations corresponded to figures from the U.S. Census and the Current Population Survey.

Analyses were then conducted to determine the percentage of students who gave various responses to each cognitive and background question. Item response theory (IRT) was used to estimate average proficiency for the nation and various subgroups of interest within the nation. IRT scaling was performed separately within each age/grade level for each of the four trend assessments (science, mathematics, reading, and writing). Each of the four assessments employs slightly different steps in data analysis and IRT scaling. The steps for each subject area are described in detail in the *NAEP 1996 Technical Report*. Because these descriptions are rather lengthy they are not repeated in this appendix.

IRT models the probability of answering a question correctly as a mathematical function of proficiency or skill. The main purpose of IRT analysis is to provide a common scale on which performance can be compared across groups, such as those defined by age, assessment year, or subpopulations (e.g., race/ethnicity or gender).

Students do not receive enough questions about a specific topic to permit reliable estimates of individual performance. Traditional test scores for individual students, even those based on IRT, would contribute to misleading estimates of population characteristics, such as subgroup averages and percentages of students at or above a certain proficiency level. Instead, NAEP constructs sets of plausible values designed to represent the distribution of proficiency in the population.[6] A plausible value for an individual is not a scale score for that individual but may be regarded as a representative value from the distribution of potential scale scores for all students in the population with similar characteristics and identical patterns of item response. Statistics describing performance on the NAEP scales are based on these plausible values. These statistics estimate values that would have been obtained had individual proficiencies been observed — that is, had each student responded to a sufficient number of cognitive questions so that his or her proficiency could be precisely estimated.

For the 1996 mathematics, reading, and science trend assessments, separate IRT scales were constructed within each grade. These scales were linked to the previously established scales within each subject area via a common population linking procedure. The reading trend scale was constructed based on the 1984 assessment and included all previous reading assessments. The science and mathematics trend scales were developed based on the 1986 science and mathematics assessments, respectively, and also included previous assessments.

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[6] For theoretical justification of the procedures employed, see Mislevy, R.J. (1988). Randomization-based inferences about latent variables from complex samples. "*Psychometrika*, 56 (2), 177-96.

For computational details, see the *NAEP 1996 Technical Report*.

The initial trend scaling, however, did not include the 1969-70 or 1973 science assessments, or the 1973 mathematics assessment, because these assessments had too few questions in common with subsequent assessments. To provide a link to the early assessment results for the nation and for subgroups defined by race/ethnicity, gender, and region at each of three age levels, estimates of average scale scores were extrapolated from previous analyses.

The extrapolated estimates were obtained by assuming that within a given age level the relationship between the logit transformation of a subgroup's average p-value (i.e., average proportion correct) for common questions and its respective scale score average was linear and that the same line held for all assessment years and for all subgroups within the age level. More details about how these estimates were extrapolated appear in *The NAEP 1996 Technical Report.* Because of the necessity for the use of extrapolation of the average scale scores for these early assessments, caution should be used in interpreting the patterns of trends across those assessment years.

For the trend writing assessments, a scale ranging from 0 to 500 was created, using a generalized partial-credit (GPC) model.[7] Developed by ETS and first used in 1992, the generalized partial-credit model permits the scaling of tasks scored according to multi-point rating schemes. The model takes full advantage of the information available from each of the student response categories used for these more complex performance tasks. A separate IRT scale was constructed within each grade. These three within-grade scales were then linked together based on common tasks using the Stocking-Lord transformation.[8] The metric of the resulting linked scales was set to an average of 250 and a standard deviation of 50 across the three grades.

As described earlier, the NAEP scales for all the subjects make it possible to examine relationships between students' performance and a variety of background factors measured by NAEP. The fact that a relationship exists between achievement and another variable, however, does not reveal the underlying cause of the relationship, which may be influenced by a number of other variables. Similarly, the assessments do not capture the influence of unmeasured variables. The results are most useful when they are considered in combination with other information about the student population and the educational system, such as trends in instruction, changes in the school-age population, and societal demands and expectations.

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[7] Muraki, E. (1992). A generalized partial credit model: Application of an EM algorithm. *Applied Psychological Measurement*, 16(2). 159-176.

[8] Stocking, M.L. & Lord, F.M. (1983). Developing a Common Metric in Item Response Theory. *Applied Psychological Measurement*. Vol. 7, 201-10.

Scale Anchoring Analysis

To facilitate interpretation of the NAEP results, the scales were divided into successive levels of performance and a "scale anchoring" process was used to define what it means to score in each of these levels. NAEP's scale anchoring follows an empirical procedure whereby the scaled assessment results are analyzed to delineate sets of questions that discriminate between adjacent performance levels on the scales. For the science, mathematics, and reading trend scales, these levels are 150, 200, 250, 300, and 350. For these five levels, questions were identified that were likely to be answered correctly by students performing at a particular level on the scale and much less likely to be answered correctly by students performing at the next lower level.

The guidelines used to select such questions were as follows: students at a given level must have at least a 65 percent probability of success with the questions, while students at the next lower level have a much lower probability of success (that is, lower than 50 percent); and the difference in probabilities between adjacent levels must exceed 30 percent. For each of the three curriculum areas, subject-matter specialists examined these empirically selected question sets and used their professional judgment to characterize each level. The reading scale anchoring was conducted on the basis of the 1984 assessment, and the scale anchoring for mathematics and science trend reporting was based on the 1986 assessments. Scale anchoring was not used with the writing assessment.

For writing, an item mapping procedure was used to portray the writing skills of students at various scale levels. Writing trend assessment tasks were scored on a three- or four-point scale. As a result of the item mapping procedure, researchers identified, for each task, the points on the NAEP writing scale at which it is estimated that 65 percent of students would write a response scored one or better (unsatisfactory response or better), two or better (minimal response or better), three or better (adequate response or better), and four (elaborated response). For those tasks having only three score points, of course, the highest category is three (adequate response).

NAEP Reporting Groups

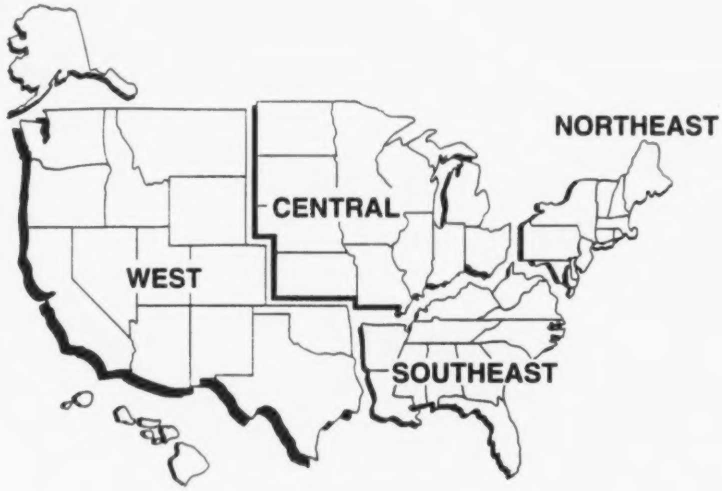
This report contains results for the nation and for groups of students within the nation defined by shared characteristics. The subgroups defined by race/ethnicity, parents' education level, gender, and region are defined below.

Race/Ethnicity. Results are presented for students in different racial/ethnic groups according to the following mutually exclusive categories: White, Black, Hispanic, Asian/Pacific Islander, and American Indian (including Alaskan Native). Some racial/ethnic results are not reported separately because there were too few students in the group. The data for all students, regardless of whether their racial/ethnic group was reported separately, were included in computing the overall national results.

Parents' Education Level. Students were asked to indicate the extent of schooling for each of their parents: did not finish high school, graduated from high school, had some education after high school, or graduated from college. The response indicating the higher level of education for either parent was selected for reporting.

Gender. Results are reported separately for males and females. Gender was reported by the student.

Region. The United States was divided into four regions: Northeast, Southeast, Central, and West. States in each region are shown on the map below. Each state except Virginia is contained entirely in one region. The part of Virginia that is part of the Washington, D.C.-Maryland-Virginia metropolitan statistical area is included in the Northeast region; the remainder of the state is included in the Southeast region.



Estimating Variability

The statistics presented in this report are estimates of group and subgroup performance based on samples of students, rather than the values that could be calculated if every student in the nation answered every assessment question. It is therefore important to have measures of the degree of uncertainty of the estimates. Accordingly, in addition to providing estimates of percentages of students and their average scale score, this report provides information about the uncertainty of each statistic.

Two components of uncertainty are accounted for in the variability of statistics based on scale scores: the uncertainty due to sampling only a small number of students relative to the whole population and the uncertainty due to sampling only a relatively small number of questions. The variability of estimates of percentages of students having certain background characteristics or answering a certain cognitive question correctly is accounted for by the first component alone. Because NAEP uses complex sampling procedures, conventional formulas for estimating sampling variability that assume simple random sampling are inappropriate. For this reason, NAEP uses a jackknife replication procedure to estimate standard errors. The jackknife standard error provides a reasonable measure of uncertainty for any information about students that can be observed without error, but each student typically responds to so few questions within any content area that the scale score for any single student would be imprecise. In this case, using plausible values technology makes it possible to describe the performance of groups and subgroups of students, but the underlying imprecision that makes this step necessary adds an additional component of variability to statistics based on NAEP scale scores.[9]

The reader is reminded that, like those from all surveys, NAEP results are also subject to other kinds of errors including the effects of necessarily imperfect adjustments for student and school nonresponse and other largely unknowable effects associated with the particular instrumentation and data collection methods used. Nonsampling errors can be attributed to a number of sources: inability to obtain complete information about all selected students in all selected schools in the sample (some students or schools refused to participate, or students participated but answered only certain questions); ambiguous definitions; differences in interpreting questions; inability or unwillingness to give correct information; mistakes in recording, coding, or scoring data; and other errors of collecting, processing, sampling, and estimating missing data. The extent of nonsampling errors is difficult to estimate. By their nature, the impacts of such error cannot be reflected in the data-based estimates of uncertainty provided in NAEP reports.

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[9] For further details, see Johnson, E.G. (1989). Considerations and techniques for the analysis of NAEP data. *Journal of Educational Statistics, 14*(4) 303-334.

Drawing Inferences from the Results

The use of confidence intervals, based on the standard errors, provides a way to make inferences about the population averages and percentages in a manner that reflects the uncertainty associated with the sample estimates. An estimated sample scale score average ± 2 standard errors represents about a 95 percent confidence interval for the corresponding population quantity. This means that with 95-percent certainty, the average performance of the entire population of interest is within about ± 2 standard errors of the sample average.

As an example, suppose that the average mathematics scale score of students in a particular group was 256, with a standard error of 1.2. A 95 percent confidence interval for the population quantity would be as follows:

$$\text{Average} \pm 2 \text{ standard errors} = 256 \pm 2\,(1.2) = 256 \pm 2.4 =$$
$$256 - 2.4 \text{ and } 256 + 2.4 = (253.6,\ 258.4)$$

Thus, one can conclude with close to 95 percent certainty that the average scale score for the entire population of students in that group is between 253.6 and 258.4.

Similar confidence intervals can be constructed for percentages, provided that the percentages are not extremely large or extremely small. For percentages, confidence intervals constructed in the above manner work best when sample sizes are large, and the percentages being tested have magnitude relatively close to 50 percent. Statements about group differences should be interpreted with caution if at least one of the groups being compared is small in size and/or if "extreme" percentages are being compared. Percentages, *P*, were treated as "extreme" if:

$P < P_{lim} = \dfrac{200}{N_{EFF} + 2}$ where the effective sample size, $N_{EEF} = \dfrac{P(100 - P)}{(SE)^2}$ and *SE* is the jackknife standard error of *P*. This "rule of thumb" cutoff leads to flagging a large proportion of confidence intervals that would otherwise include values < 0 or > 1. Similarly, at the other end of the 0 - 100 scale, a percentage is deemed extreme if $100 - P < P_{lim}$. In either extreme case, the confidence intervals described above are not appropriate, and procedures for obtaining accurate confidence intervals are quite complicated. In this case, the value of *P* was reported, but no standard error was estimated and hence no tests were conducted.

As for percentages, confidence intervals for average scale scores are most accurate when sample sizes are large. For some of the subgroups of students for which average scale scores or percentages were reported, student samples sizes could be quite small. For results to be reported for any subgroup, a minimum student sample size of 62 was required. If students in a particular subgroup were clustered within a small number of geographic primary sampling units (PSUs), the estimates of the standard errors might also be inaccurate. So, subgroup data were required to come from a minimum of five PSUs.

To determine whether there is a real difference between the average scale score (or percentage of a certain attribute) for two groups in the population, one needs to obtain an estimate of the degree of uncertainty associated with the difference between the average scale scores or percentages of these groups for the sample. This estimate of the degree of uncertainty — called the standard error of the difference between the groups — is obtained by squaring each group's standard error, summing these squared standard errors, and then taking the square root of this sum. This procedure produces a conservative estimate of the standard error of the difference, since the estimates of the group averages or percentages will be positively correlated to an unknown extent due to the sampling plan. Direct estimation of the standard errors of all reported differences would involve a heavy computational burden. Similar to the manner in which the standard error for an individual group average or percentage is used, the standard error of the difference can be used to help determine whether differences between assessment years are real. If zero is within the confidence interval for the differences there is no statistically significant difference between the groups.

To be more specific about the way in which differences between average scale scores for two groups were shown to be statistically significant with 95 percent certainty, whenever comparisons were made with the students assessed in the assessment years for which average scale scores were extrapolated (1970 and 1973 for science; 1973 for mathematics) ± about 2 standard errors (from a normal distribution) was used to construct the confidence interval. However, when the two groups that were being compared were from other assessments (those with scale scores estimated without extrapolation), the number multiplied by the standard error varied. This multiplier is the .975(1-.025) percentile from a T-distribution with the degrees of freedom that vary by the values of the average scale scores, their standard errors, and the number of PSUs that contribute to the average scale scores. (See the *NAEP 1996 National Technical Report* for more details.)

Sometimes a group of related comparisons are made, such as comparing the average scale scores for a previous assessment with those for the current assessment year for specific groups of students. If one wants to hold the certainty level for a specific set of comparisons at a particular level (e.g., 95), adjustments (called multiple-comparisons procedures) need to be made. One such procedure — the Bonferroni method — was used to form confidence intervals for the differences for sets of comparisons. The set of comparisons is referred to as a "family," and the typical family involves all subgroups related by a certain background question. An example of a set of comparisons is the comparison of average science scale scores from 1996 and 1990 for male students and the comparison of average scale scores from 1996 and 1990 for female students.

Multiple-comparisons procedures, like the Bonferroni method, are useful for controlling the overall Type I error rate for a defined set of hypothesis tests. However, especially when the number of potential comparisons which could be made is large, as in NAEP data, this protection comes at the substantial loss of power in detecting specific consistent patterns in the data. For example, more powerful and complex tests of significance designed to identify consistent patterns in the data might judge that two groups were significantly different when a Bonferroni multiple-comparisons procedure would not.

One such set of tests of significance is the test of linear and test of quadratic trends applied to the trend data for the nation and selected subpopulations. The purpose of this first set of general tests was to determine whether the results of the series of assessments in a given subject could be generally characterized as increasing or decreasing, and whether the results could be generally characterized as a simple curve. A linear relationship indicates that results have steadily increased (or decreased) over the time period of interest. Simple curvilinear (i.e., quadratic) relationships capture more complex patterns. For example, one possible pattern is to have initial score declines over part of the time period followed by score increases in more recent assessments. Another possible pattern is to have a sequence of several assessments in which scores increased followed by a period of relative stable performance. These examples are two, but not all, of the simple curvilinear relationships that were tested.

The linear and quadratic components of the trend in average scale scores for a given subject area and age group were estimated by applying two sets of contrasts to the set of average scale scores by year. The linear component of the trend was estimated by the sum $b_1 = \sum c_j x_j$, where the x_j are the average scale scores by year and the c_j are defined such that b_1 corresponds to the slope of an unweighted regression of the average scale scores on the assessment year. The quadratic component was estimated by the sum $b_2 = \sum d_j x_j$, in which the d_j are formally orthogonal to the c_j and are defined such that b_2 is the quadratic term in the unweighted regression of the average scale scores on the assessment year and the square of the assessment year. The statistical significance of b_1 and b_2 was evaluated by comparing each estimate to its estimated standard error. The standard error of b_1 was estimated as the square root of the sum $\sum c_j^2 SE_j^2$, in which SE_j is the estimated standard error of x_j. The estimated standard error of the b_2 was analogously defined. The linear and quadratic trend tests make it possible to make statements about results across assessment years in a more powerful way than if results for each year had been compared to those of every other year, using a multiple-comparison procedure such as the Bonferroni method. These tests do not control the overall Type I error rate when they are applied to several related subgroups, such as the students in each region of the country. For this reason, the Bonferroni method for controlling Type I error was used when the trends for related subgroups were tested. For example, when tests were conducted for linear trend for the separate race/ethnicity groups (i.e., White, Black, and Hispanic) these tests were treated as a single family of comparisons of size 3. The significance level for each of the separate tests was adjusted by the Bonferroni procedure to yield a family-wise error rate of .05.

The reader is cautioned that some averages and standard errors in this report may differ slightly from values reported in previous trend reports because of a slight modification of procedures. The method used to round off numbers to the number of reported decimal places was modified to conform to NCES standards, beginning with the analysis of the 1994 long-term trend assessments.

Data Appendix A

Science

Table A.1

NAEP 1996 Science Long-Term Trend Assessment — Age 9
Percentages of students with science scale scores at or above 150

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	93.5(0.6)	95.2(0.7)	96.2(0.3)	97.0(0.3)	97.4(0.3)	97.2(0.4)	96.8(0.5)	+		+	–
Gender											
Male	94.3(0.5)	95.0(1.0)	96.8(0.5)	96.8(0.5)	97.7(0.3)	97.1(0.4)	96.9(0.5)	+		+	
Female	92.8(0.7)	95.5(1.2)	95.6(0.6)	97.1(0.4)	97.1(0.5)	97.3(0.5)	96.6(0.6)	+		+	–
Race/Ethnicity											
White	97.7(0.3)	98.3(0.4)	98.2(0.3)	99.2(0.2)	99.2(0.1)	99.1(0.3)	98.7(0.4)			+	
Black	72.4(1.8)	82.1(3.0)	88.6(1.4)	88.0(1.3)	90.7(1.8)	91.0(1.5)	90.7(1.5)	+		+	–
Hispanic	84.6(1.8)	85.1(3.1)	89.6(2.4)	93.6(1.5)	92.4(1.7)	91.1(2.3)	92.5(1.8)	+		+	
Other	94.9(2.4)	*****	95.9(1.8)	96.3(****)	96.3(1.8)	93.9(1.7)	94.6(2.4)				
Grade											
Below Modal Grade	86.2(1.1)	88.5(1.9)	91.8(0.8)	93.2(0.9)	94.5(0.7)	94.3(0.9)	93.9(1.1)	+		+	
At Modal Grade	95.9(0.6)	98.1(0.6)	98.5(0.3)	99.0(0.3)	99.2(0.2)	98.6(0.3)	98.2(0.3)	+		+	–
Above Modal Grade	96.4(2.2)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	94.6(0.7)	94.5(1.4)	96.7(0.9)	97.1(0.6)	97.9(0.9)	97.9(0.5)	97.6(0.6)	+		+	
Southeast	87.8(1.8)	92.7(1.6)	95.0(1.2)	94.6(0.9)	95.6(0.5)	96.5(0.8)	95.4(1.0)	+		+	
Central	95.5(0.8)	97.5(1.1)	97.1(0.6)	98.4(0.7)	98.7(0.5)	98.0(0.7)	97.2(0.5)				
West	94.9(1.1)	95.4(1.3)	95.9(0.7)	97.7(0.7)	97.3(0.5)	96.3(0.8)	96.8(0.9)				
Parents' Education Level											
Less than H.S.	86.0(1.7)	85.5(3.5)	90.1(3.4)	93.3(2.3)	96.0(1.5)	93.2(1.9)	94.1(3.3)			+	
Graduated H.S.	95.0(0.5)	96.1(1.0)	95.6(0.6)	96.9(0.8)	95.2(0.7)	96.6(0.8)	96.0(1.2)				
Some Education After H.S.	97.1(0.9)	96.6(1.8)	98.0(1.1)	97.6(1.2)	97.6(1.0)	97.8(1.0)	98.5(0.5)				
Graduated College	96.8(0.6)	97.2(0.7)	98.0(0.4)	98.1(0.4)	98.5(0.5)	98.2(0.3)	98.2(0.4)				
Unknown	91.4(0.8)	93.8(1.9)	95.0(0.6)	96.0(0.6)	97.1(0.5)	96.3(0.8)	95.2(1.0)	+		+	
Type of School											
Public	93.0(0.7)	94.9(0.8)	95.8(0.4)	96.7(0.4)	97.1(0.4)	96.9(0.4)	96.7(0.5)	+		+	–
Nonpublic	98.1(0.6)	98.9(****)	98.2(0.7)	98.7(****)	99.2(****)	99.3(0.4)	97.2(1.3)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	99.5(0.1)	100.0(****)	99.8(0.1)	100.0(****)	100.0(****)	100.0(****)	99.9(****)				
Lower	75.2(1.4)	81.0(2.5)	85.2(1.1)	87.9(1.2)	89.6(1.3)	88.9(1.3)	88.2(1.7)	+		+	–

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.2

NAEP 1996 Science Long-Term Trend Assessment — Age 9

Percentages of students with science scale scores at or above 200

THE NATION'S REPORT CARD

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	68.0(1.1)	70.7(1.9)	72.0(1.1)	76.4(0.9)	78.0(1.2)	77.4(1.0)	76.0(1.0)	+		+	
Gender											
Male	69.5(1.2)	69.7(2.0)	74.1(1.4)	76.3(1.2)	80.4(1.4)	77.6(0.9)	77.0(1.7)	+		+	
Female	66.5(1.1)	71.8(2.2)	70.0(1.3)	76.4(1.1)	75.7(1.2)	77.2(1.4)	75.0(0.9)	+		+	
Race/Ethnicity											
White	76.8(0.7)	78.4(2.0)	78.9(1.0)	84.4(0.7)	85.5(0.9)	85.6(1.0)	83.9(1.1)	+		+	
Black	27.2(1.5)	38.9(2.7)	46.2(2.3)	46.4(3.1)	51.3(3.5)	51.6(2.3)	51.3(3.0)	+		+	
Hispanic	42.0(3.1)	40.2(6.1)	50.1(3.7)	56.3(3.7)	55.5(4.3)	49.9(3.1)	57.1(2.5)	+		+	
Other	62.0(6.9)	*****	67.4(4.1)	76.3(7.0)	73.2(3.7)	65.3(5.6)	70.7(5.8)				
Grade											
Below Modal Grade	48.8(1.8)	50.1(3.3)	55.1(1.7)	61.1(2.1)	64.5(1.6)	64.4(1.4)	63.7(2.3)	+		+	
At Modal Grade	74.2(1.1)	79.6(1.9)	80.7(0.9)	84.5(1.0)	86.1(1.3)	83.8(1.3)	82.1(1.1)	+		+	–
Above Modal Grade	83.0(4.1)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	72.6(1.6)	71.5(3.5)	75.6(2.5)	78.2(2.3)	80.6(2.2)	80.0(2.7)	79.7(1.6)	+		+	
Southeast	55.0(2.4)	63.0(3.6)	67.3(3.0)	68.4(2.4)	71.4(2.4)	74.5(2.7)	70.7(2.9)	+		+	
Central	72.5(2.1)	75.4(3.7)	75.2(2.1)	81.9(1.3)	83.7(1.4)	81.9(2.2)	79.0(2.0)			+	
West	68.5(2.3)	71.4(3.8)	69.9(3.0)	76.8(2.1)	75.9(2.7)	73.6(2.1)	74.8(1.6)				
Parents' Education Level											
Less than H.S.	49.8(2.4)	54.9(8.7)	55.1(3.6)	60.5(4.2)	68.5(3.2)	61.8(4.0)	63.0(3.8)	+		+	
Graduated H.S.	71.2(1.4)	68.2(4.3)	69.1(1.9)	75.2(2.1)	71.2(2.0)	73.7(1.9)	70.6(2.7)				
Some Education After H.S.	81.9(1.5)	80.7(2.4)	80.2(1.9)	81.3(2.3)	82.1(1.9)	82.8(2.5)	83.9(3.1)				
Graduated College	77.7(1.2)	78.8(2.0)	80.4(1.2)	81.9(1.2)	84.3(1.3)	83.1(1.3)	83.1(1.6)	+		+	
Unknown	60.8(1.5)	60.9(3.6)	65.0(2.0)	71.3(1.4)	73.2(1.8)	71.6(2.0)	68.8(1.2)	+		+	
Type of School											
Public	66.4(1.3)	69.5(2.1)	70.5(1.3)	75.5(1.0)	76.7(1.3)	76.1(1.2)	75.1(1.2)	+		+	
Nonpublic	80.3(1.7)	82.6(3.5)	79.7(2.3)	83.6(2.4)	86.2(2.0)	87.1(2.4)	81.3(3.2)				
Quartiles											
Upper	99.0(0.3)	100.0(****)	99.7(0.2)	99.9(****)	99.9(****)	99.9(****)	99.9(****)				
Middle two	78.4(0.6)	85.6(1.9)	84.9(1.1)	90.0(0.8)	91.3(1.0)	91.3(0.9)	91.1(1.1)	+		+	–
Lower	16.2(1.1)	11.6(2.0)	18.6(1.6)	25.6(2.0)	29.2(2.3)	27.3(2.1)	27.4(2.0)	+		+	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.3

NAEP 1996 Science Long-Term Trend Assessment — Age 9
Percentages of students with science scale scores at or above 250

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	25.7(0.7)	24.3(1.8)	27.5(1.4)	31.1(0.8)	32.3(1.0)	33.7(1.2)	32.4(1.2)	+		+	
Gender											
Male	27.4(0.9)	25.6(2.6)	29.9(2.0)	33.1(1.1)	37.2(1.7)	35.3(1.4)	34.4(1.8)	+		+	
Female	24.0(0.9)	23.0(2.0)	25.1(1.4)	29.1(1.0)	28.6(1.1)	32.2(1.5)	30.5(1.8)	+		+	
Race/Ethnicity											
White	30.8(0.7)	29.4(2.1)	32.7(1.5)	37.5(1.1)	39.4(1.1)	40.8(1.5)	39.9(1.5)	+		+	
Black	3.5(0.6)	3.9(1.3)	8.3(1.5)	8.5(1.1)	9.2(1.4)	11.1(1.4)	10.6(1.9)	+		+	
Hispanic	8.8(1.7)	4.2(2.7)	10.7(2.4)	11.6(2.1)	11.7(1.8)	10.8(2.5)	12.7(2.9)				
Other	20.5(4.9)	*****	27.1(5.8)	30.1(6.0)	30.4(4.7)	22.1(4.3)	25.5(5.5)				
Grade											
Below Modal Grade	11.0(0.9)	8.4(1.7)	13.0(1.3)	16.5(1.2)	20.0(1.6)	20.3(1.6)	18.3(0.8)	+		+	
At Modal Grade	30.3(0.9)	31.0(2.5)	35.0(1.7)	39.0(1.1)	40.4(1.0)	40.5(1.6)	39.5(1.7)	+		+	
Above Modal Grade	-45.7(7.0)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	28.9(1.1)	25.8(3.1)	30.5(2.9)	33.4(2.9)	35.9(2.7)	36.8(2.3)	35.7(2.9)			+	
Southeast	17.2(1.5)	20.2(3.6)	23.3(3.0)	24.9(1.4)	26.5(1.8)	30.4(2.3)	27.6(3.0)	+		+	
Central	29.2(1.6)	27.5(3.6)	30.1(2.3)	34.4(1.8)	38.7(2.3)	38.1(2.6)	35.9(2.5)			+	
West	25.3(1.2)	23.1(4.6)	26.2(2.6)	31.7(1.7)	29.8(2.2)	30.1(2.7)	30.8(2.5)				
Parents' Education Level											
Less than H.S.	12.7(1.3)	8.6(4.0)	12.7(2.7)	16.3(3.5)	19.6(2.8)	16.2(3.1)	20.4(4.5)			+	
Graduated H.S.	27.0(1.2)	20.3(3.1)	23.1(1.8)	27.3(1.8)	26.2(1.7)	27.4(2.3)	24.5(2.3)				
Some Education After H.S.	39.4(1.5)	31.9(5.1)	38.5(3.7)	40.7(2.5)	39.2(3.1)	42.1(4.3)	43.5(5.1)				
Graduated College	35.1(1.2)	32.2(2.7)	36.8(1.8)	38.3(1.2)	40.2(1.4)	40.6(1.6)	41.8(1.9)	+		+	
Unknown	18.9(0.8)	16.1(2.1)	19.5(1.7)	23.9(1.3)	26.5(1.7)	26.8(1.9)	22.8(1.9)			+	
Type of School											
Public	24.5(0.9)	23.9(2.1)	26.3(1.5)	30.3(0.8)	31.5(1.0)	32.5(1.4)	31.1(1.3)	+		+	
Nonpublic	35.6(1.9)	28.2(5.6)	33.8(2.8)	37.2(3.0)	40.6(3.4)	42.7(2.8)	40.6(3.6)			+	
Quartiles											
Upper	70.1(1.1)	79.1(3.0)	76.1(2.0)	80.2(1.5)	82.7(1.6)	82.4(1.4)	83.0(1.4)	+		+	
Middle two	16.2(0.6)	9.1(1.9)	16.9(1.5)	22.1(1.0)	23.9(1.3)	24.4(1.6)	23.0(1.6)	+		+	
Lower	0.2(0.1)	0.0(****)	0.2(****)	0.2(0.1)	0.4(0.2)	0.4(0.2)	0.4(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.4

NAEP 1996 Science Long-Term Trend Assessment — Age 9
Percentages of students with science scale scores at or above 300

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	3.2(0.3)	2.3(0.7)	3.0(0.5)	3.1(0.3)	3.4(0.3)	3.8(0.4)	4.4(0.5)	+		+	+
Gender											
Male	3.7(0.3)	2.5(1.0)	3.8(0.6)	4.2(0.6)	4.6(0.6)	4.5(0.7)	5.4(0.8)			+	
Female	2.6(0.3)	2.1(0.6)	2.2(0.5)	2.0(0.3)	2.2(0.3)	3.2(0.4)	3.5(0.6)				+
Race/Ethnicity											
White	3.9(0.3)	2.9(0.9)	3.8(0.6)	3.9(0.4)	4.3(0.4)	4.9(0.6)	6.0(0.7)	+		+	+
Black	0.2(****)	0.1(****)	0.3(****)	0.1(****)	0.3(****)	0.2(****)	0.3(****)				
Hispanic	0.3(****)	0.0(****)	0.2(****)	0.4(****)	0.4(****)	0.7(0.5)	0.3(****)				
Other	1.9(1.0)	*****	2.1(1.1)	3.2(1.5)	3.2(1.5)	1.4(****)	1.8(0.9)				
Grade											
Below Modal Grade	0.7(0.1)	0.1(****)	0.6(0.2)	0.9(0.4)	1.2(0.3)	1.4(0.5)	1.4(0.4)				
At Modal Grade	3.9(0.4)	3.0(0.9)	4.2(0.7)	4.3(0.5)	4.7(0.4)	5.0(0.6)	6.0(0.8)	+		+	
Above Modal Grade	9.7(5.1)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	3.6(0.4)	2.6(1.2)	3.7(1.9)	3.4(0.7)	4.1(0.8)	4.5(1.0)	5.8(1.4)				
Southeast	1.6(0.3)	1.4(0.5)	2.3(0.4)	2.2(0.7)	2.5(0.7)	3.1(1.2)	3.2(0.8)				
Central	3.8(0.5)	2.9(1.5)	3.2(0.8)	3.8(0.8)	4.4(0.6)	4.3(0.9)	5.1(0.8)				
West	3.2(0.5)	2.1(****)	2.7(0.9)	3.0(0.5)	2.6(0.5)	3.4(0.5)	3.8(0.8)				
Parents' Education Level											
Less than H.S.	0.9(0.4)	0.2(****)	0.8(****)	0.5(****)	1.7(1.0)	0.6(****)	1.2(****)				
Graduated H.S.	3.2(0.3)	1.8(****)	1.6(0.5)	2.0(0.6)	1.8(0.6)	2.5(0.7)	1.7(0.8)				
Some Education After H.S.	5.7(1.0)	2.4(****)	4.4(1.4)	5.4(1.3)	4.8(1.5)	6.2(1.5)	7.0(2.8)				
Graduated College	5.4(0.7)	3.7(1.1)	5.0(1.0)	4.5(0.6)	5.0(0.6)	5.1(0.7)	7.1(0.8)				
Unknown	1.7(0.4)	0.8(0.5)	1.4(0.4)	1.6(0.5)	1.9(0.4)	2.4(0.5)	2.0(0.5)				
Type of School											
Public	2.9(0.3)	2.3(0.7)	2.8(0.6)	3.0(0.4)	3.2(0.3)	3.6(0.5)	4.2(0.4)	+		+	
Nonpublic	5.1(1.1)	2.1(1.2)	4.0(0.7)	3.9(1.0)	4.6(1.3)	5.6(1.0)	6.4(1.9)				
Quartiles											
Upper	12.0(0.9)	9.1(2.3)	11.7(1.7)	12.1(1.3)	13.2(1.1)	13.9(1.6)	16.9(1.6)	+		+	+
Middle two	0.3(0.1)	0.0(****)	0.1(0.1)	0.2(****)	0.2(0.1)	0.2(0.1)	0.1(****)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.5

NAEP 1996 Science Long-Term Trend Assessment — Age 9
Percentages of students with science scale scores at or above 350

THE NATION'S REPORT CARD naep

	1977	1982	1986	1990	1992	1994	1996	* ‡ L Q
TOTAL	0.1(0.0)	0.0(****)	0.1(****)	0.1(0.0)	0.1(****)	0.1(0.0)	0.1(0.1)	
Gender								
Male	0.1(0.0)	0.1(****)	0.1(****)	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.2(0.1)	
Female	0.1(0.0)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	
Race/Ethnicity								
White	0.1(0.0)	0.1(****)	0.1(****)	0.1(0.1)	0.1(****)	0.1(0.1)	0.2(0.1)	
Black	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Hispanic	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Other	0.0(****)	*****	0.1(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	
Grade								
Below Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
At Modal Grade	0.1(0.0)	0.1(****)	0.2(****)	0.1(0.1)	0.1(****)	0.1(0.1)	0.2(0.1)	
Above Modal Grade	0.9(****)	*****	*****	*****	*****	*****	*****	
Region								
Northeast	0.1(0.1)	0.0(****)	0.2(****)	0.0(****)	0.1(****)	0.1(****)	0.2(****)	
Southeast	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.0(0.0)	0.1(****)	0.1(****)	
Central	0.1(****)	0.0(****)	0.1(****)	0.1(****)	0.2(****)	0.1(0.1)	0.1(****)	
West	0.0(****)	0.1(****)	0.1(****)	0.1(****)	0.0(****)	0.1(****)	0.1(0.1)	
Parents' Education Level								
Less than H.S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	
Graduated H.S.	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	
Some Education After H.S.	0.1(****)	0.0(****)	0.1(****)	0.1(****)	0.1(****)	0.1(****)	0.2(****)	
Graduated College	0.1(0.1)	0.1(****)	0.2(****)	0.1(0.1)	0.1(0.1)	0.1(****)	0.2(0.1)	
Unknown	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	
Type of School								
Public	0.0(0.0)	0.1(****)	0.1(****)	0.1(0.0)	0.1(0.0)	0.1(0.1)	0.1(****)	
Nonpublic	0.2(****)	0.0(****)	0.2(****)	0.1(****)	0.1(****)	0.1(****)	0.3(****)	
Quartiles								
Upper	0.2(0.1)	0.2(****)	0.4(****)	0.2(0.1)	0.3(****)	0.3(0.2)	0.5(0.3)	
Middle two	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table A.6

NAEP 1996 Science Long-Term Trend Assessment — Age 13
Percentages of students with science scale scores at or above 150

THE NATION'S REPORT CARD naep

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	98.5(0.2)	99.5(0.1)	99.7(0.1)	99.7(0.1)	99.6(0.1)	99.7(0.1)	99.7(0.1)	+		+	−
Gender											
Male	98.8(0.2)	99.7(0.1)	99.8(0.1)	99.7(0.1)	99.6(0.2)	99.7(0.1)	99.7(0.2)	+		+	−
Female	98.2(0.2)	99.2(0.2)	99.7(0.1)	99.7(0.2)	99.6(0.2)	99.7(0.2)	99.6(0.1)	+		+	−
Race/Ethnicity											
White	99.6(0.1)	99.9(0.0)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)				
Black	93.1(1.0)	97.5(0.7)	99.0(0.4)	98.8(0.6)	97.8(0.6)	98.8(0.6)	98.6(0.8)	+		+	−
Hispanic	94.3(1.3)	98.0(0.8)	99.0(0.6)	98.9(0.6)	99.5(****)	99.2(0.4)	99.1(0.5)	+			
Other	98.0(1.1)	99.8(****)	100.0(****)	99.5(****)	99.7(****)	99.3(****)	99.6(****)				
Grade											
Below Modal Grade	96.0(0.5)	98.4(0.4)	99.3(0.3)	99.3(0.2)	99.1(0.3)	99.3(0.3)	99.3(0.3)	+		+	−
At Modal Grade	99.4(0.1)	99.9(0.1)	99.9(0.0)	99.9(0.0)	99.9(****)	99.9(0.0)	99.9(0.1)	+			
Above Modal Grade	100.0(****)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	99.3(0.2)	99.5(0.2)	99.8(0.1)	99.7(****)	99.4(0.3)	100.0(****)	99.7(****)				
Southeast	97.3(0.4)	98.9(0.4)	99.5(0.3)	99.6(0.2)	99.4(0.3)	99.6(****)	99.6(0.2)	+			
Central	99.1(0.2)	99.8(0.1)	99.8(****)	99.9(****)	99.8(0.1)	99.7(****)	99.8(****)				
West	98.1(0.3)	99.5(0.2)	99.8(0.1)	99.6(0.2)	99.7(****)	99.5(****)	99.6(0.2)	+			
Parents' Education Level											
Less than H.S.	96.4(0.6)	97.9(0.9)	98.6(1.0)	99.5(****)	98.5(1.1)	99.3(****)	99.0(0.4)	+			
Graduated H.S.	99.0(0.2)	99.6(0.3)	99.8(0.1)	99.7(0.2)	99.3(0.3)	99.6(0.2)	99.5(0.2)				
Some Education After H.S.	99.6(0.2)	99.8(****)	99.9(****)	99.9(****)	100.0(****)	99.9(****)	99.8(****)				
Graduated College	99.7(0.1)	99.9(****)	99.9(****)	99.9(****)	99.9(0.1)	99.9(****)	99.9(0.1)				
Unknown	95.5(0.7)	98.6(0.6)	98.9(0.5)	98.4(0.7)	98.7(0.6)	98.7(****)	99.0(0.6)	+			
Type of School											
Public	98.4(0.2)	99.4(0.1)	99.7(0.1)	99.7(0.1)	99.5(0.1)	99.7(0.1)	99.6(0.1)	+		+	−
Nonpublic	99.8(****)	99.8(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	99.9(****)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	94.1(0.6)	97.9(0.5)	98.8(0.4)	98.8(0.3)	98.3(0.5)	98.9(0.4)	98.8(0.4)	+		+	−

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table A.7

NAEP 1996 Science Long-Term Trend Assessment — Age 13
Percentages of students with science scale scores at or above 200

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	86.0(0.7)	89.8(0.8)	91.6(1.0)	92.3(0.7)	93.1(0.5)	92.4(0.6)	92.2(0.6)	+		+	–
Gender											
Male	87.2(0.8)	91.9(0.8)	92.9(1.0)	92.7(0.8)	93.1(0.8)	92.2(0.8)	93.2(0.9)	+		+	–
Female	84.7(0.8)	87.9(1.0)	90.3(1.2)	92.0(0.8)	93.1(0.7)	92.6(0.6)	91.1(0.9)	+		+	–
Race/Ethnicity											
White	92.2(0.5)	94.4(0.6)	96.1(0.8)	96.9(0.4)	97.9(0.4)	97.6(0.4)	97.2(0.5)	+		+	–
Black	57.3(2.4)	68.6(2.4)	73.6(3.0)	77.6(3.6)	73.8(2.8)	73.5(3.2)	76.3(2.7)	+		+	–
Hispanic	62.2(2.4)	75.5(3.3)	76.7(3.2)	80.2(2.9)	86.2(2.6)	81.2(2.5)	80.9(2.3)	+		+	–
Other	80.9(2.9)	94.2(2.4)	93.6(3.8)	88.1(4.9)	94.5(1.9)	92.6(1.9)	89.8(2.2)				
Grade											
Below Modal Grade	71.4(1.6)	78.0(1.8)	83.1(1.9)	84.9(1.5)	87.1(1.2)	86.4(1.0)	87.6(1.3)	+		+	–
At Modal Grade	91.3(0.6)	94.4(0.6)	95.7(0.7)	96.5(0.5)	96.7(0.6)	95.9(0.7)	94.7(0.6)	+		+	–
Above Modal Grade	98.4(0.9)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	90.7(1.4)	91.5(1.1)	93.5(1.2)	92.6(1.8)	91.6(1.5)	95.4(1.0)	91.9(1.6)				
Southeast	78.1(1.7)	83.6(2.2)	89.8(1.7)	91.0(1.2)	90.7(1.5)	90.6(1.3)	90.4(1.5)	+		+	–
Central	89.9(1.1)	92.0(1.3)	91.9(3.5)	94.6(1.8)	95.4(0.8)	94.0(2.0)	95.9(1.1)	+		+	
West	83.5(1.5)	91.3(1.4)	91.3(1.6)	91.2(1.3)	94.1(1.0)	90.4(1.3)	90.9(1.1)	+		+	–
Parents' Education Level											
Less than H.S.	71.6(1.6)	75.8(2.4)	79.8(3.5)	82.4(2.9)	82.4(3.1)	81.9(2.3)	80.4(3.4)			+	
Graduated H.S.	87.0(0.8)	88.6(1.1)	90.7(1.4)	91.4(1.1)	89.3(1.2)	90.6(1.2)	90.3(1.2)			+	
Some Education After H.S.	93.4(0.9)	94.9(1.4)	95.9(0.7)	96.6(0.8)	98.0(0.7)	94.8(1.1)	95.7(1.0)				
Graduated College	95.0(0.5)	95.5(0.7)	95.8(0.7)	96.4(0.5)	97.1(0.5)	96.5(0.4)	95.5(0.7)				
Unknown	70.1(1.9)	77.9(2.1)	78.1(3.1)	75.4(2.9)	79.9(1.9)	79.9(2.6)	81.8(2.6)	+		+	
Type of School											
Public	84.9(0.8)	89.2(0.9)	91.3(1.0)	91.6(0.8)	92.7(0.5)	91.9(0.6)	91.6(0.7)	+		+	–
Nonpublic	95.7(1.0)	95.0(1.5)	97.3(1.8)	98.4(0.8)	96.4(1.1)	96.5(1.4)	96.2(2.1)				
Quartiles											
Upper	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	95.5(0.3)	98.2(0.2)	99.4(0.2)	99.6(0.2)	99.8(0.1)	99.8(0.1)	99.7(0.1)	+		+	–
Lower	53.0(1.3)	63.0(2.0)	67.5(2.7)	70.1(2.1)	72.9(1.5)	71.6(1.7)	73.3(1.7)	+		+	–

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table A.8

NAEP 1996 Science Long-Term Trend Assessment — Age 13
Percentages of students with science scale scores at or above 250

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	48.8(1.1)	50.9(1.6)	52.5(1.6)	56.5(1.0)	61.3(1.1)	59.5(1.1)	57.7(1.2)	+		+	
Gender											
Male	52.3(1.3)	56.2(1.8)	57.3(2.1)	59.8(1.3)	62.9(1.4)	62.0(1.3)	61.9(1.4)	+		+	
Female	45.4(1.2)	46.0(1.6)	47.7(1.7)	53.3(1.4)	59.6(1.4)	57.1(1.4)	53.8(1.7)	+		+	
Race/Ethnicity											
White	56.5(0.9)	58.3(1.4)	61.0(1.7)	66.5(1.2)	71.1(1.3)	70.5(1.1)	68.7(1.4)	+		+	
Black	14.9(1.7)	17.1(1.9)	19.6(2.8)	24.3(3.3)	26.2(2.8)	22.4(4.3)	25.3(2.1)	+		+	
Hispanic	18.1(1.8)	24.1(5.1)	24.9(4.3)	30.0(2.8)	36.5(2.9)	31.6(3.3)	30.7(3.3)	+		+	
Other	35.6(4.9)	64.8(7.1)	52.6(6.6)	47.1(10.2)	62.0(3.9)	58.9(4.7)	50.9(4.5)				
Grade											
Below Modal Grade	26.4(1.3)	28.3(2.1)	33.0(1.9)	39.4(1.8)	46.3(1.7)	45.3(1.8)	47.3(2.0)	+		+	
At Modal Grade	56.8(1.1)	59.7(1.7)	61.9(1.6)	66.3(1.2)	70.1(1.2)	67.6(1.1)	63.3(1.3)	+	–	+	–
Above Modal Grade	82.3(4.0)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	56.1(2.0)	55.1(2.7)	59.0(4.0)	58.1(2.7)	60.4(2.8)	66.3(2.0)	57.4(4.1)				
Southeast	37.5(1.6)	40.1(2.3)	48.6(3.3)	52.7(2.7)	57.5(2.5)	54.6(3.2)	51.6(2.7)	+		+	
Central	54.8(2.0)	54.1(3.5)	49.5(6.3)	62.7(3.1)	66.2(2.2)	64.1(3.7)	68.9(1.8)	+		+	
West	44.5(2.4)	53.0(3.3)	53.3(2.8)	53.2(2.2)	60.4(2.2)	54.6(2.1)	54.5(1.8)	+		+	
Parents' Education Level											
Less than H.S.	26.0(1.2)	24.2(2.1)	28.6(3.5)	31.1(2.4)	34.2(3.3)	34.9(4.4)	31.4(3.9)			+	
Graduated H.S.	46.4(1.4)	43.1(2.0)	44.4(2.0)	47.4(1.7)	48.6(2.0)	48.3(1.8)	49.3(2.0)				
Some Education After H.S.	61.0(1.5)	60.3(2.3)	61.0(2.4)	65.3(1.9)	71.3(1.7)	62.7(2.1)	63.7(1.8)			+	
Graduated College	67.1(1.1)	65.6(1.9)	67.0(2.1)	70.2(1.4)	73.2(1.5)	73.1(1.4)	68.1(1.3)			+	
Unknown	25.7(2.1)	28.0(3.0)	23.9(2.6)	23.3(2.3)	31.0(2.6)	30.3(3.0)	35.6(2.9)	+			
Type of School											
Public	46.7(1.2)	49.2(1.8)	51.9(1.7)	54.7(1.2)	60.2(1.2)	57.8(1.2)	56.1(1.3)	+		+	
Nonpublic	68.8(2.6)	65.8(4.1)	66.8(8.2)	72.0(2.6)	68.9(3.1)	72.7(3.2)	70.9(5.2)				
Quartiles											
Upper	92.0(0.5)	95.1(0.6)	97.8(0.5)	99.1(0.3)	99.6(****)	99.5(****)	99.6(****)				
Middle two	49.0(1.0)	51.8(1.3)	54.5(1.9)	61.6(1.1)	69.4(1.4)	68.0(1.6)	67.3(1.3)	+		+	
Lower	5.3(0.5)	5.2(0.8)	3.2(0.9)	3.9(0.8)	6.5(0.8)	6.4(1.1)	7.0(1.4)				+

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.9

NAEP 1996 Science Long-Term Trend Assessment — Age 13
Percentages of students with science scale scores at or above 300

THE NATION'S REPORT CARD

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	11.1(0.5)	9.6(0.7)	9.1(0.9)	11.2(0.6)	12.0(0.8)	11.8(0.9)	12.3(0.6)			+	+
Gender											
Male	13.1(0.6)	12.6(1.1)	11.9(1.3)	14.0(0.9)	14.2(1.1)	14.8(1.1)	15.7(0.8)	+		+	
Female	9.0(0.5)	6.9(0.7)	6.3(1.1)	8.5(0.6)	9.9(0.8)	8.8(1.0)	9.1(0.8)				+
Race/Ethnicity											
White	13.4(0.5)	11.5(0.8)	11.3(1.2)	14.2(0.8)	15.0(1.0)	14.8(1.0)	15.9(0.9)			+	+
Black	1.2(0.4)	0.8(0.3)	1.1(0.4)	1.5(0.5)	1.8(0.8)	2.2(****)	2.0(0.9)				
Hispanic	1.8(0.8)	2.4(0.9)	1.5(0.7)	3.3(0.8)	3.3(1.3)	2.4(0.9)	3.2(0.8)				
Other	5.6(2.0)	15.9(3.5)	7.4(2.8)	9.1(4.6)	14.0(2.7)	13.6(4.5)	9.6(2.8)				
Grade											
Below Modal Grade	3.3(0.4)	2.6(0.4)	3.4(0.6)	5.1(0.6)	6.3(0.8)	7.0(0.6)	7.9(1.0)	+		+	+
At Modal Grade	13.7(0.5)	12.3(0.9)	11.8(1.3)	14.7(0.9)	15.2(1.0)	14.4(1.1)	14.4(0.7)			+	
Above Modal Grade	34.5(5.0)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	13.8(1.0)	11.2(1.3)	12.4(2.2)	12.6(1.6)	11.7(1.4)	13.4(1.9)	12.3(1.2)				
Southeast	7.1(0.7)	5.1(0.6)	6.5(1.1)	8.8(0.9)	11.0(2.1)	10.0(1.2)	9.6(1.8)			+	
Central	13.2(1.0)	10.7(1.4)	7.4(1.6)	13.3(1.4)	13.6(1.3)	13.9(1.9)	16.4(1.4)			+	+
West	9.4(0.8)	10.9(1.6)	10.2(1.7)	10.4(1.3)	11.7(1.1)	10.1(1.3)	11.4(1.3)				
Parents' Education Level											
Less than H.S.	2.9(0.4)	1.8(0.8)	1.9(1.1)	2.5(0.8)	1.7(0.8)	2.7(1.2)	3.6(1.3)				
Graduated H.S.	8.4(0.6)	4.9(0.7)	4.5(1.0)	6.3(1.0)	6.3(0.8)	5.6(1.0)	6.2(1.0)				
Some Education After H.S.	15.7(1.1)	12.4(1.6)	9.5(1.3)	12.8(1.1)	13.0(1.4)	12.3(2.2)	11.7(1.4)				
Graduated College	19.6(0.9)	15.7(1.3)	15.7(2.0)	17.4(1.1)	17.7(1.3)	17.9(1.4)	18.2(1.2)				
Unknown	3.1(0.4)	2.6(0.8)	2.2(0.9)	1.7(0.7)	3.3(0.9)	1.7(0.7)	5.7(1.5)				
Type of School											
Public	10.2(0.5)	8.9(0.8)	8.9(0.9)	10.7(0.7)	11.9(0.9)	11.3(0.9)	11.5(0.8)			+	
Nonpublic	19.6(1.9)	16.0(2.4)	12.8(3.6)	16.2(1.5)	13.2(2.0)	15.5(2.6)	18.5(3.2)				
Quartiles											
Upper	36.5(0.8)	33.8(2.0)	34.2(3.2)	41.6(1.5)	43.9(2.8)	44.1(2.3)	46.7(1.6)	+		+	+
Middle two	3.9(0.4)	2.4(0.4)	1.1(0.3)	1.6(0.4)	2.1(0.5)	1.8(0.4)	2.0(0.4)	–		–	+
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.10

NAEP 1996 Science Long-Term Trend Assessment — Age 13
Percentages of students with science scale scores at or above 350

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	0.7(0.1)	0.4(0.1)	0.2(0.1)	0.4(0.1)	0.2(0.1)	0.2(0.1)	0.4(0.2)				
Gender											
Male	0.9(0.2)	0.5(0.2)	0.3(0.2)	0.6(0.2)	0.3(0.1)	0.3(0.2)	0.7(0.3)				
Female	0.4(0.1)	0.2(0.1)	0.1(0.1)	0.2(****)	0.2(****)	0.1(****)	0.2(****)				
Race/Ethnicity											
White	0.8(0.1)	0.4(0.1)	0.3(0.1)	0.5(0.1)	0.3(0.1)	0.3(0.1)	0.6(0.3)				
Black	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)				
Hispanic	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)				
Other	0.1(****)	0.8(****)	0.2(****)	0.7(****)	0.6(****)	0.1(****)	0.4(****)				
Grade											
Below Modal Grade	0.1(****)	0.1(****)	0.0(****)	0.1(****)	0.0(****)	0.1(****)	0.2(0.1)				
At Modal Grade	0.8(0.1)	0.5(0.2)	0.3(0.1)	0.5(0.2)	0.3(0.1)	0.2(0.1)	0.5(0.2)				
Above Modal Grade	4.4(1.9)	*****	*****	*****	*****	*****	*****				
Region											
Northeast	0.9(0.3)	0.5(0.2)	0.5(0.3)	0.4(0.2)	0.2(****)	0.2(****)	0.6(****)				
Southeast	0.3(0.1)	0.1(****)	0.1(****)	0.4(0.2)	0.2(****)	0.2(****)	0.3(****)				
Central	1.0(0.3)	0.4(****)	0.1(****)	0.5(0.3)	0.3(****)	0.3(****)	0.6(0.3)				
West	0.4(0.1)	0.4(0.3)	0.2(****)	0.3(****)	0.2(0.1)	0.1(****)	0.3(****)				
Parents' Education Level											
Less than H.S.	0.1(0.1)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)				
Graduated H.S.	0.3(0.1)	0.1(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)				
Some Education After H.S.	1.0(0.2)	0.4(****)	0.1(****)	0.3(****)	0.3(****)	0.3(****)	0.3(****)				
Graduated College	1.4(0.3)	0.7(0.2)	0.5(0.2)	0.8(0.3)	0.4(0.2)	0.3(0.1)	0.8(0.4)				
Unknown	0.1(0.1)	0.0(****)	0.0(****)	0.0(****)	0.1(0.1)	0.0(****)	0.1(****)				
Type of School											
Public	0.6(0.1)	0.3(0.1)	0.2(0.1)	0.4(0.1)	0.3(0.1)	0.2(0.1)	0.4(0.2)				
Nonpublic	1.6(0.3)	0.8(0.5)	0.3(****)	0.5(****)	0.1(****)	0.1(****)	1.0(****)				
Quartiles											
Upper	2.6(0.4)	1.4(0.4)	0.9(0.4)	1.6(0.4)	0.9(0.4)	0.8(0.4)	1.8(0.8)				
Middle two	0.0(0.0)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.11

NAEP 1996 Science Long-Term Trend Assessment — Age 17
Percentages of students with science scale scores at or above 150

	1977	1982	1986	1990	1992	1994	1996	* ‡ L Q
TOTAL	99.8(0.0)	99.7(0.1)	99.9(****)	99.9(****)	100.0(****)	99.8(0.1)	100.0(****)	
Gender								
Male	99.9(0.0)	99.8(0.1)	99.9(****)	99.9(****)	99.9(****)	99.8(****)	99.9(****)	
Female	99.7(0.1)	99.6(0.1)	99.9(****)	99.9(****)	100.0(****)	99.9(****)	100.0(****)	
Race/Ethnicity								
White	100.0(0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Black	98.5(0.3)	97.9(0.5)	99.7(****)	99.4(****)	99.8(****)	99.6(****)	99.8(****)	
Hispanic	99.7(0.2)	98.9(****)	99.8(****)	99.6(****)	100.0(****)	99.3(****)	99.9(****)	
Other	99.9(****)	99.8(****)	99.2(****)	99.9(****)	99.9(****)	99.0(****)	100.0(****)	
Grade								
Below Modal Grade	98.9(0.3)	98.6(0.4)	99.6(****)	99.4(****)	99.8(****)	99.5(0.3)	99.8(****)	
At Modal Grade	100.0(0.0)	99.9(0.1)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	
Above Modal Grade	99.9(0.0)	99.8(****)	100.0(****)	100.0(****)	100.0(****)	99.7(****)	100.0(****)	
Region								
Northeast	99.9(****)	99.6(0.2)	99.9(****)	99.8(****)	100.0(****)	99.7(0.2)	100.0(****)	
Southeast	99.5(0.2)	99.5(0.3)	99.9(****)	99.9(****)	99.9(****)	99.9(****)	99.8(****)	
Central	99.9(0.0)	99.8(****)	100.0(****)	99.9(****)	100.0(****)	99.8(****)	100.0(****)	
West	99.9(0.0)	99.7(0.2)	99.8(****)	99.9(****)	100.0(****)	99.8(****)	100.0(****)	
Parents' Education Level								
Less than H.S.	99.5(0.2)	99.1(0.4)	99.6(****)	99.5(****)	99.9(****)	99.4(****)	99.8(****)	
Graduated H.S.	99.9(0.0)	99.6(0.2)	99.9(****)	99.9(****)	99.9(****)	99.8(****)	99.9(****)	
Some Education After H.S.	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	
Graduated College	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Unknown	98.4(0.6)	98.3(1.1)	98.7(****)	98.6(****)	99.9(****)	98.4(****)	99.7(****)	
Type of School								
Public	99.8(0.0)	99.6(0.1)	99.9(****)	99.8(****)	100.0(****)	99.8(0.1)	99.9(****)	
Nonpublic	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Quartiles								
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Lower	99.2(0.2)	98.7(0.3)	99.6(****)	99.4(****)	99.8(****)	99.3(0.4)	99.8(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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**** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.12

NAEP 1996 Science Long-Term Trend Assessment — Age 17

Percentages of students with science scale scores at or above 200

THE NATION'S REPORT CARD

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	97.1(0.2)	95.7(0.5)	97.1(0.5)	96.7(0.3)	97.8(0.5)	97.1(0.7)	97.8(0.3)			+	
Gender											
Male	97.8(0.2)	96.8(0.5)	97.4(0.7)	96.8(0.5)	98.0(0.6)	97.1(0.6)	97.6(0.5)				
Female	96.4(0.3)	94.6(0.8)	96.9(0.5)	96.6(0.6)	97.5(0.7)	97.2(1.0)	98.0(0.5)	+		+	
Race/Ethnicity											
White	99.2(0.1)	98.6(0.2)	98.8(0.3)	99.0(0.2)	99.3(0.3)	99.3(0.3)	99.4(0.3)				
Black	83.6(1.3)	79.7(1.9)	90.9(2.1)	88.3(1.9)	92.1(1.8)	91.1(1.9)	92.7(1.4)	+		+	
Hispanic	93.1(1.7)	86.9(2.9)	93.3(2.4)	91.9(2.2)	94.6(2.6)	89.9(3.3)	93.8(2.1)				
Other	97.1(1.8)	95.1(2.2)	89.3(4.8)	96.3(1.6)	95.1(2.6)	95.8(2.8)	98.4(****)				
Grade											
Below Modal Grade	88.4(1.1)	85.6(1.6)	90.7(2.1)	89.9(1.6)	92.9(1.3)	90.7(1.8)	94.0(1.1)	+		+	
At Modal Grade	98.5(0.1)	97.5(0.4)	98.5(0.3)	98.6(0.2)	99.3(0.3)	98.8(0.5)	99.0(0.3)			+	
Above Modal Grade	99.0(0.3)	97.3(1.2)	98.0(****)	98.8(****)	98.7(0.7)	98.2(0.9)	98.4(****)				
Region											
Northeast	98.0(0.4)	95.7(0.9)	97.1(1.5)	96.4(1.1)	98.3(0.6)	97.1(1.1)	97.7(0.4)				
Southeast	94.2(0.7)	93.9(1.5)	96.6(1.2)	95.8(0.6)	96.6(1.0)	97.0(1.1)	97.4(1.0)			+	
Central	98.0(0.3)	97.4(0.7)	98.4(0.5)	97.8(0.7)	98.6(0.8)	97.9(0.9)	99.3(0.5)				
West	97.3(0.3)	95.0(0.9)	96.3(0.9)	96.7(0.6)	97.6(0.9)	96.3(1.6)	96.9(0.8)				
Parents' Education Level											
Less than H.S.	93.1(0.8)	90.1(1.6)	91.7(2.3)	91.7(2.2)	93.1(3.3)	89.7(3.1)	92.6(2.6)				
Graduated H.S.	97.3(0.3)	95.2(0.8)	96.7(0.9)	94.9(1.0)	96.9(0.9)	96.2(1.2)	96.3(0.9)				
Some Education After H.S.	98.9(0.2)	98.0(0.4)	98.6(0.8)	98.7(0.5)	98.8(0.7)	98.4(0.7)	99.0(0.3)				
Graduated College	99.5(0.1)	98.2(0.3)	99.2(0.3)	98.7(0.3)	98.9(0.5)	99.0(0.4)	98.9(0.4)				
Unknown	85.8(1.6)	85.4(3.2)	83.9(5.0)	84.8(5.0)	90.3(4.0)	84.3(4.8)	89.0(5.0)				
Type of School											
Public	97.0(0.2)	95.4(0.6)	97.0(0.5)	96.5(0.4)	97.5(0.5)	96.8(0.7)	97.7(0.3)			+	
Nonpublic	99.5(0.2)	97.9(0.7)	99.8(****)	99.5(****)	100.0(****)	99.3(0.4)	98.8(****)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	99.9(0.1)	99.7(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	88.7(0.7)	83.2(1.6)	88.5(1.7)	86.8(1.2)	91.1(1.7)	87.7(2.4)	90.7(1.2)			+	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

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Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table A.13

NAEP 1996 Science Long-Term Trend Assessment — Age 17
Percentages of students with science scale scores at or above 250

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	81.6(0.7)	76.6(1.0)	80.7(1.3)	81.2(0.9)	83.3(1.2)	83.1(1.2)	83.6(0.9)			+	+
Gender											
Male	85.2(0.7)	81.2(1.2)	82.4(1.4)	82.5(1.2)	85.0(1.4)	84.9(1.3)	83.9(1.1)				
Female	78.0(1.0)	72.2(1.3)	79.1(1.7)	79.9(1.4)	81.6(1.4)	81.6(1.6)	83.4(1.2)	+		+	
Race/Ethnicity											
White	88.2(0.4)	84.9(0.9)	87.8(1.4)	89.6(0.8)	90.5(1.0)	91.5(0.9)	91.3(0.6)	+		+	
Black	40.5(1.5)	35.0(2.1)	52.2(3.2)	51.4(3.7)	55.7(3.7)	58.1(3.7)	59.0(3.4)	+		+	
Hispanic	61.5(1.7)	48.0(2.7)	60.0(7.2)	59.9(5.0)	68.3(6.6)	58.6(7.4)	66.2(4.0)				
Other	78.7(2.9)	65.4(5.8)	71.0(7.0)	79.2(3.8)	78.4(4.4)	82.7(5.0)	80.3(7.4)				
Grade											
Below Modal Grade	53.6(1.4)	49.9(2.6)	58.1(2.8)	59.5(2.5)	61.0(3.1)	60.2(2.9)	66.8(2.6)	+		+	
At Modal Grade	86.0(0.6)	81.3(1.0)	85.2(1.4)	87.2(0.8)	90.5(0.9)	89.1(0.8)	89.3(0.7)	+		+	+
Above Modal Grade	88.2(1.0)	83.0(2.4)	86.8(2.6)	86.8(2.3)	88.7(2.9)	89.2(3.1)	83.8(3.6)				
Region											
Northeast	85.4(1.6)	77.5(1.9)	80.8(3.9)	82.1(2.8)	85.8(2.3)	85.5(2.9)	84.0(2.1)				
Southeast	72.2(1.5)	71.2(2.3)	76.9(1.9)	76.8(2.2)	76.1(2.0)	80.2(2.4)	78.9(2.1)			+	
Central	85.1(1.1)	81.1(2.3)	85.7(1.8)	86.9(2.0)	90.3(2.2)	85.4(2.9)	91.0(1.6)	+		+	
West	79.9(1.2)	74.8(2.5)	78.8(3.0)	79.0(1.9)	81.7(3.0)	81.7(3.0)	80.8(2.1)				
Parents' Education Level											
Less than H.S.	64.8(1.5)	58.2(2.6)	59.8(3.5)	62.0(4.3)	61.2(4.8)	57.0(5.3)	58.7(4.9)				
Graduated H.S.	80.0(1.0)	72.3(1.5)	74.1(2.1)	73.4(1.5)	76.6(2.5)	75.6(2.1)	75.9(2.6)				
Some Education After H.S.	87.0(0.8)	83.1(1.4)	86.8(1.9)	88.1(1.6)	87.5(1.3)	86.6(1.6)	87.5(1.3)				
Graduated College	92.9(0.5)	86.7(1.4)	89.6(1.4)	88.9(1.1)	90.2(1.3)	92.1(0.8)	89.9(1.4)				
Unknown	52.7(2.6)	52.1(4.2)	47.4(7.9)	48.5(5.5)	54.1(7.5)	45.7(6.7)	52.6(8.3)				
Type of School											
Public	80.8(0.7)	75.8(1.0)	80.1(1.4)	80.4(0.9)	82.0(1.2)	81.7(1.3)	83.1(1.1)			+	+
Nonpublic	92.9(1.2)	83.5(2.8)	96.5(2.2)	90.6(4.1)	95.5(2.0)	93.1(2.3)	89.6(3.2)				
Quartiles											
Upper	99.7(0.1)	99.5(0.2)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	91.9(0.4)	88.1(0.7)	95.8(0.6)	96.5(0.6)	97.5(0.6)	97.2(0.5)	97.5(0.9)	+		+	
Lower	42.6(1.1)	30.5(1.5)	31.2(2.4)	31.7(2.2)	38.2(3.0)	35.1(2.3)	35.9(2.9)				+

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.14

NAEP 1996 Science Long-Term Trend Assessment — Age 17
Percentages of students with science scale scores at or above 300

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	41.7(0.9)	37.3(0.9)	41.3(1.4)	43.3(1.3)	46.6(1.5)	47.5(1.3)	48.5(1.3)	+		+	+
Gender											
Male	48.8(1.1)	45.2(1.2)	48.8(2.1)	48.2(1.6)	50.9(2.0)	52.9(1.8)	53.3(1.7)			+	
Female	34.8(1.0)	29.9(1.2)	34.1(1.5)	38.7(1.7)	42.0(1.7)	42.4(1.8)	43.9(1.9)	+		+	+
Race/Ethnicity											
White	47.5(0.7)	43.9(1.1)	48.7(1.7)	51.2(1.5)	55.4(1.7)	57.5(1.6)	58.7(1.6)	+		+	+
Black	7.7(1.0)	6.5(1.1)	12.5(2.2)	15.7(4.0)	14.1(2.5)	15.4(2.3)	17.2(2.1)	+		+	
Hispanic	18.5(2.1)	11.1(2.0)	14.8(2.9)	21.1(3.3)	23.0(3.8)	21.7(4.1)	24.0(3.1)			+	
Other	36.6(3.8)	25.2(4.8)	35.0(8.1)	45.2(6.5)	42.9(6.1)	44.4(8.0)	47.0(7.4)				
Grade											
Below Modal Grade	14.5(0.9)	16.0(1.8)	17.9(1.9)	19.6(1.5)	19.1(2.2)	22.0(2.3)	27.6(2.3)	+		+	
At Modal Grade	45.7(0.8)	40.7(1.1)	45.6(1.7)	50.0(1.5)	55.2(1.7)	54.2(1.4)	55.2(1.6)	+		+	+
Above Modal Grade	50.5(1.8)	45.4(3.2)	50.6(5.9)	49.2(3.2)	54.9(3.4)	52.8(4.3)	53.3(5.8)				
Region											
Northeast	47.9(1.8)	38.3(1.9)	46.6(4.0)	45.7(2.7)	52.0(2.5)	52.0(3.6)	48.8(4.1)				
Southeast	31.6(1.8)	32.2(2.2)	37.0(2.0)	37.5(2.7)	36.9(2.8)	40.9(2.5)	41.0(2.8)	+		+	
Central	45.0(1.3)	42.1(2.2)	45.0(2.5)	51.7(3.1)	56.4(2.6)	51.1(2.7)	59.4(3.4)	+		+	
West	38.6(1.4)	35.0(2.2)	36.3(3.5)	38.7(2.5)	42.2(3.4)	46.2(3.5)	45.1(2.2)			+	
Parents' Education Level											
Less than H.S.	21.6(1.0)	17.3(1.7)	14.9(2.4)	18.2(2.8)	16.8(2.5)	14.7(2.3)	17.3(3.4)				
Graduated H.S.	35.8(0.8)	29.5(1.3)	29.5(2.0)	30.8(1.5)	32.1(2.7)	32.8(2.4)	36.6(3.0)				+
Some Education After H.S.	46.0(1.3)	41.6(2.1)	46.7(3.0)	46.7(1.9)	48.5(2.1)	47.2(2.2)	48.8(2.6)				
Graduated College	59.6(1.2)	52.5(1.9)	55.3(2.4)	57.3(2.0)	60.0(1.7)	62.6(1.9)	59.4(1.8)				
Unknown	16.6(2.3)	15.5(2.9)	11.4(4.4)	13.5(3.9)	18.3(5.9)	14.4(4.1)	18.8(4.6)				
Type of School											
Public	40.5(0.8)	36.6(0.9)	39.9(1.5)	42.0(1.3)	44.8(1.5)	45.3(1.1)	47.8(1.4)	+		+	+
Nonpublic	58.9(2.8)	44.2(2.6)	74.6(10.9)	59.8(6.7)	63.1(5.3)	62.7(5.2)	56.5(6.4)				
Quartiles											
Upper	86.6(0.9)	82.8(1.3)	96.7(1.0)	98.4(0.5)	99.4(0.3)	99.6(****)	99.1(0.4)	+			
Middle two	38.2(0.9)	32.5(1.1)	34.1(1.2)	37.3(1.6)	43.2(2.3)	44.6(1.3)	45.6(1.8)	+		+	+
Lower	3.8(0.4)	1.7(0.3)	0.3(****)	0.4(****)	0.5(0.3)	0.4(****)	0.4(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.15

NAEP 1996 Science Long-Term Trend Assessment — Age 17
Percentages of students with science scale scores at or above 350

THE NATION'S REPORT CARD naep

	1977	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	8.5(0.4)	[illegible](0.4)	7.9(0.7)	9.2(0.5)	10.1(0.7)	10.0(0.8)	10.8(0.9)	+		+	+
Gender											
Male	11.8(0.6)	10.4(0.8)	11.4(1.3)	13.0(0.8)	13.6(1.0)	13.8(1.2)	14.3(1.5)			+	
Female	5.3(0.4)	3.9(0.4)	4.5(0.8)	5.5(0.5)	6.6(1.0)	6.4(0.6)	7.4(0.9)			+	+
Race/Ethnicity											
White	10.0(0.4)	8.6(0.6)	9.6(0.9)	11.4(0.7)	12.8(0.9)	13.2(1.1)	14.0(1.3)	+		+	
Black	0.4(0.2)	0.2(0.2)	0.9(0.6)	1.5(0.8)	0.8(****)	0.5(0.3)	0.9(0.5)				
Hispanic	1.8(0.6)	1.4(0.9)	1.1(0.7)	2.1(****)	2.5(1.2)	1.5(0.7)	2.8(1.3)				
Other	6.3(2.2)	2.8(1.9)	8.6(****)	11.6(4.1)	10.2(2.8)	7.3(2.8)	12.5(4.5)				
Grade											
Below Modal Grade	1.3(0.3)	2.0(0.6)	2.0(0.9)	2.6(0.8)	2.4(0.7)	3.2(0.9)	3.3(1.2)				
At Modal Grade	9.3(0.4)	7.8(0.6)	8.7(0.9)	10.9(0.6)	12.3(0.8)	11.7(1.0)	13.1(1.3)	+		+	
Above Modal Grade	12.6(1.0)	9.6(1.0)	12.1(3.2)	12.1(3.0)	16.0(4.0)	13.4(3.4)	14.2(2.9)				
Region											
Northeast	10.8(0.9)	7.6(0.9)	10.8(1.9)	10.2(1.1)	12.9(1.9)	13.2(2.2)	11.3(2.1)				
Southeast	5.2(0.7)	5.7(0.9)	6.0(1.2)	6.7(1.0)	6.2(0.7)	6.8(1.4)	7.7(1.5)				
Central	9.6(0.6)	7.9(1.2)	8.7(1.7)	12.5(1.2)	13.1(1.4)	11.0(1.5)	14.8(1.9)			+	
West	7.2(0.8)	6.7(0.8)	5.9(1.7)	7.4(1.1)	8.9(1.9)	9.4(2.2)	9.6(1.4)				
Parents' Education Level											
Less than H.S.	2.2(0.3)	1.9(0.6)	0.7(****)	1.3(0.7)	1.6(0.6)	0.9(****)	2.7(1.7)				
Graduated H.S.	5.7(0.3)	3.9(0.7)	3.7(0.8)	3.8(0.8)	4.8(1.2)	3.6(1.0)	5.4(1.3)				
Some Education After H.S.	8.7(0.8)	7.4(1.2)	8.0(1.4)	8.8(0.9)	7.8(1.0)	7.2(0.9)	8.1(1.7)				
Graduated College	15.7(0.8)	12.4(0.8)	13.2(1.4)	15.3(0.9)	16.3(1.2)	16.7(1.5)	16.3(1.4)				
Unknown	1.7(0.6)	1.8(1.0)	1.0(****)	0.8(****)	2.4(****)	2.4(****)	1.3(****)				
Type of School											
Public	8.1(0.4)	6.9(0.4)	7.2(0.7)	8.7(0.5)	9.6(0.8)	9.4(0.5)	10.7(1.0)			+	+
Nonpublic	14.8(1.9)	8.5(2.3)	23.1(7.7)	15.8(3.2)	14.1(2.7)	14.8(4.0)	12.6(3.2)				
Quartiles											
Upper	29.2(1.1)	24.5(1.4)	31.1(2.0)	36.3(1.5)	39.7(2.0)	40.2(2.0)	41.8(3.1)	+		+	
Middle two	2.4(0.2)	1.9(0.2)	0.2(0.1)	0.2(****)	0.5(0.3)	0.5(0.2)	0.4(0.2)	–			
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table A.16

NAEP 1996 Long-Term Trend Science Results — Age 9

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD

	1977	1982	1986	1990	1992	1994	1996
TOTAL SAMPLE							
Mean	219.9 (1.2)	220.8 (1.8)	224.3 (1.2)	228.7 (0.8)	230.6 (1.0)	231.0 (1.2)	229.8 (1.2)
Standard Deviation	44.9 (0.6)	40.9 (1.4)	41.6 (0.6)	40.2 (0.4)	39.9 (0.7)	40.9 (0.5)	42.2 (0.6)
Percentiles							
5	143.8 (2.3)	150.9 (4.9)	155.0 (1.3)	159.8 (1.3)	162.8 (2.0)	161.1 (1.7)	158.8 (1.9)
10	160.9 (2.1)	166.8 (2.6)	169.9 (1.8)	176.1 (1.1)	177.8 (1.8)	177.0 (1.7)	174.5 (1.8)
25	190.1 (1.6)	194.4 (2.2)	195.9 (1.3)	202.0 (1.4)	203.8 (1.6)	203.4 (1.6)	201.3 (1.5)
50	221.5 (1.1)	221.4 (2.4)	225.1 (1.7)	230.3 (0.9)	232.1 (0.9)	233.2 (1.9)	231.0 (1.4)
75	251.0 (1.1)	249.0 (2.0)	253.1 (1.7)	256.6 (0.8)	258.4 (1.0)	259.6 (1.1)	258.9 (1.7)
90	276.5 (1.2)	272.4 (3.9)	276.9 (2.0)	278.8 (1.3)	280.6 (1.6)	281.5 (0.9)	283.6 (1.4)
95	291.4 (1.2)	286.4 (3.7)	290.9 (1.9)	292.1 (1.4)	293.6 (1.4)	295.1 (1.4)	298.0 (1.9)
MALE STUDENTS							
Mean	222.1 (1.3)	221.0 (2.3)	227.3 (1.4)	230.3 (1.1)	234.7 (1.2)	232.2 (1.3)	232.0 (1.8)
Standard Deviation	45.0 (0.7)	42.0 (2.0)	41.9 (0.7)	41.9 (0.6)	40.7 (1.0)	41.8 (0.7)	42.9 (0.8)
Percentiles							
5	146.8 (2.6)	150.4 (5.5)	158.0 (3.6)	159.6 (2.2)	164.7 (3.0)	161.1 (3.9)	160.3 (2.0)
10	163.2 (1.9)	166.5 (3.8)	172.9 (1.8)	176.3 (2.3)	180.9 (2.7)	176.9 (2.1)	176.5 (2.1)
25	191.9 (1.9)	193.5 (4.1)	198.7 (1.8)	202.1 (2.5)	207.2 (1.9)	203.7 (1.5)	202.9 (2.0)
50	223.6 (1.4)	221.3 (3.6)	227.9 (1.7)	231.6 (1.9)	236.2 (1.5)	234.1 (1.6)	232.7 (2.7)
75	253.4 (1.4)	250.4 (3.1)	256.1 (1.9)	259.4 (1.0)	263.1 (1.5)	261.8 (1.1)	262.1 (2.9)
90	279.1 (1.3)	274.7 (4.3)	280.3 (2.0)	283.3 (1.8)	285.8 (1.5)	284.4 (1.7)	286.9 (2.3)
95	294.2 (1.5)	287.1 (5.3)	294.8 (2.7)	296.3 (2.4)	298.6 (1.5)	298.3 (2.3)	301.4 (2.4)
FEMALE STUDENTS							
Mean	217.6 (1.2)	220.7 (2.0)	221.3 (1.4)	227.1 (1.0)	226.7 (1.0)	230.0 (1.4)	227.7 (1.4)
Standard Deviation	44.6 (0.8)	39.8 (1.3)	41.1 (0.8)	38.4 (0.5)	38.8 (0.6)	39.9 (0.7)	41.3 (1.0)
Percentiles							
5	141.3 (3.5)	151.2 (6.6)	152.5 (2.5)	159.9 (2.4)	161.0 (3.4)	161.8 (3.1)	157.3 (2.6)
10	158.5 (2.2)	167.5 (3.1)	166.9 (2.6)	175.8 (2.2)	175.3 (2.2)	177.2 (2.9)	172.3 (2.7)
25	188.3 (1.4)	195.3 (2.6)	193.2 (1.8)	201.9 (1.2)	200.9 (1.5)	203.1 (1.9)	200.0 (1.1)
50	219.5 (1.2)	221.4 (3.6)	222.5 (2.0)	229.2 (1.1)	228.5 (1.4)	232.5 (2.5)	229.6 (1.9)
75	248.6 (1.1)	247.4 (2.4)	250.2 (1.9)	254.0 (1.1)	253.7 (1.5)	257.7 (1.2)	256.2 (1.8)
90	273.8 (1.6)	270.6 (3.4)	273.3 (1.6)	274.6 (1.9)	275.0 (1.7)	279.2 (1.7)	279.0 (2.4)
95	288.2 (1.6)	284.4 (3.3)	287.0 (2.6)	287.0 (1.9)	287.7 (1.2)	291.6 (1.2)	293.5 (2.6)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.16
(continued)

NAEP 1996 Long-Term Trend Science Results — Age 9

Scale Score Means, Standard Deviations, and Percentiles

	1977	1982	1986	1990	1992	1994	1996
WHITE STUDENTS							
Mean	229.6 (0.9)	229.0 (1.9)	231.9 (1.2)	237.5 (0.8)	239.1 (1.0)	240.3 (1.3)	239.3 (1.4)
Standard Deviation	40.0 (0.5)	37.6 (1.3)	39.2 (0.7)	36.3 (0.4)	36.4 (0.5)	37.1 (0.6)	39.5 (0.6)
Percentiles							
5	163.2 (1.3)	167.0 (3.0)	166.5 (2.3)	176.9 (1.4)	178.0 (2.0)	177.2 (2.3)	172.9 (2.9)
10	177.6 (1.1)	182.2 (3.1)	181.0 (1.5)	189.9 (1.3)	191.7 (1.5)	191.3 (1.8)	187.9 (1.6)
25	202.4 (1.1)	203.8 (2.6)	205.5 (1.5)	212.6 (0.8)	214.5 (1.3)	215.3 (1.2)	212.5 (1.6)
50	229.8 (0.9)	228.6 (2.4)	232.5 (1.6)	238.3 (1.0)	240.0 (1.1)	241.8 (1.4)	239.9 (1.3)
75	256.9 (0.8)	254.9 (2.0)	258.8 (1.4)	262.3 (1.0)	264.2 (1.3)	265.7 (1.5)	266.5 (1.8)
90	281.1 (1.1)	277.6 (2.8)	281.7 (1.7)	283.5 (1.4)	285.1 (1.6)	286.5 (1.0)	289.3 (2.3)
95	295.4 (1.9)	290.8 (4.0)	294.9 (2.5)	295.7 (1.3)	297.5 (0.8)	299.6 (2.6)	303.0 (1.9)
BLACK STUDENTS							
Mean	174.8 (1.8)	187.0 (3.0)	196.2 (1.9)	196.4 (2.0)	200.3 (2.7)	201.4 (1.7)	201.3 (2.6)
Standard Deviation	41.4 (1.0)	37.7 (1.9)	38.3 (1.0)	38.6 (1.0)	37.3 (0.7)	38.2 (1.4)	38.2 (1.0)
Percentiles							
5	107.0 (3.5)	123.6 (11.0)	132.8 (3.2)	131.3 (4.2)	138.0 (4.2)	138.4 (2.7)	138.5 (2.4)
10	122.8 (3.4)	136.7 (8.3)	146.9 (3.5)	145.3 (3.8)	151.6 (4.0)	152.5 (3.2)	151.8 (2.8)
25	146.6 (2.4)	159.2 (4.9)	169.7 (2.6)	169.8 (2.6)	173.7 (3.5)	175.2 (2.8)	175.1 (4.7)
50	173.8 (2.5)	188.2 (5.0)	195.9 (2.2)	196.3 (2.5)	201.1 (3.0)	201.5 (2.3)	201.6 (3.2)
75	202.9 (1.8)	214.4 (3.8)	222.6 (1.5)	224.1 (1.7)	226.3 (3.4)	227.5 (3.3)	228.0 (3.5)
90	229.2 (2.9)	236.4 (4.7)	246.4 (3.7)	246.8 (2.4)	248.4 (3.0)	252.2 (2.4)	251.0 (2.4)
95	244.1 (2.9)	246.5 (3.3)	259.5 (3.5)	260.0 (5.4)	260.5 (4.6)	263.2 (1.6)	263.8 (3.1)
HISPANIC STUDENTS							
Mean	191.9 (2.7)	189.0 (4.2)	199.4 (3.1)	206.2 (2.2)	204.7 (2.8)	201.0 (2.7)	206.7 (2.5)
Standard Deviation	41.2 (1.4)	36.6 (2.3)	38.9 (1.6)	37.0 (1.7)	37.3 (1.4)	38.6 (2.0)	38.1 (1.5)
Percentiles							
5	125.2 (7.0)	127.3 (9.6)	134.1 (10.1)	146.2 (5.5)	143.0 (3.0)	138.7 (9.1)	142.4 (3.3)
10	139.8 (3.3)	141.9 (16.8)	148.1 (5.2)	158.6 (4.3)	156.8 (3.9)	152.0 (4.1)	156.4 (3.7)
25	163.9 (4.3)	161.9 (7.4)	172.6 (3.4)	180.6 (3.7)	179.1 (3.5)	175.5 (3.4)	179.6 (3.1)
50	191.4 (3.6)	190.8 (4.8)	199.8 (6.7)	206.2 (3.7)	204.8 (4.1)	199.7 (2.2)	208.0 (2.3)
75	219.0 (3.2)	215.9 (3.4)	225.6 (4.1)	232.7 (4.1)	230.4 (2.3)	227.3 (4.8)	235.0 (3.2)
90	245.7 (4.9)	236.2 (5.6)	252.1 (5.4)	252.9 (4.4)	253.7 (5.5)	251.2 (6.5)	255.2 (4.5)
95	261.3 (6.4)	246.0 (7.6)	264.9 (6.7)	266.8 (6.9)	264.9 (3.5)	264.4 (4.3)	267.7 (4.6)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.17

NAEP 1996 Long-Term Trend Science Results — Age 13

Scale Score Means, Standard Deviations, and Percentiles

	1977	1982	1986	1990	1992	1994	1996
TOTAL SAMPLE							
Mean	247.4 (1.1)	250.1 (1.3)	251.4 (1.4)	255.2 (0.9)	258.0 (0.8)	256.8 (1.0)	256.1 (1.0)
Standard Deviation	43.5 (0.4)	38.6 (0.5)	36.6 (0.6)	37.6 (0.7)	36.9 (0.5)	37.2 (0.7)	38.3 (0.6)
Percentiles							
5	173.7 (1.7)	185.2 (2.2)	188.9 (2.2)	191.4 (2.0)	193.1 (1.5)	191.0 (1.7)	190.6 (1.8)
10	190.6 (1.4)	199.6 (1.8)	203.3 (2.0)	205.9 (1.7)	208.9 (1.3)	206.7 (1.4)	205.3 (1.5)
25	218.4 (1.4)	224.1 (1.1)	227.2 (1.3)	230.0 (1.5)	234.7 (1.3)	232.7 (1.3)	230.4 (1.5)
50	248.6 (1.2)	250.9 (1.3)	252.1 (1.8)	256.4 (1.2)	260.4 (1.0)	259.2 (0.9)	257.7 (1.2)
75	277.5 (0.9)	276.7 (1.5)	276.5 (1.5)	281.1 (0.9)	283.8 (1.0)	283.0 (1.1)	282.9 (1.3)
90	302.4 (0.9)	299.2 (1.6)	298.2 (2.0)	302.4 (1.1)	303.1 (1.2)	303.1 (1.7)	304.4 (1.0)
95	316.9 (1.5)	312.8 (1.3)	310.3 (1.6)	315.1 (1.9)	314.6 (1.4)	314.3 (1.9)	316.8 (1.7)
MALE STUDENTS							
Mean	251.1 (1.3)	255.6 (1.5)	256.1 (1.6)	258.5 (1.1)	260.1 (1.2)	259.4 (1.2)	260.7 (1.1)
Standard Deviation	43.9 (0.5)	38.7 (0.6)	37.4 (1.0)	38.8 (0.8)	38.0 (0.8)	39.0 (0.8)	39.1 (0.6)
Percentiles							
5	176.7 (1.9)	190.2 (2.6)	192.3 (4.2)	191.9 (2.5)	193.4 (2.7)	189.6 (2.5)	193.6 (2.8)
10	193.5 (1.6)	204.4 (1.6)	207.2 (2.5)	207.3 (3.4)	209.4 (2.4)	206.2 (1.6)	208.9 (2.6)
25	221.5 (1.7)	229.5 (1.7)	231.1 (1.6)	232.9 (1.4)	235.8 (1.1)	234.4 (1.4)	233.9 (1.4)
50	252.4 (1.5)	256.7 (1.5)	256.9 (2.0)	260.3 (1.4)	262.7 (1.5)	262.0 (1.6)	262.4 (0.8)
75	281.6 (1.2)	282.6 (1.5)	282.4 (1.4)	285.8 (2.2)	287.0 (1.8)	287.4 (1.9)	288.6 (1.8)
90	306.5 (1.3)	305.0 (1.7)	303.4 (1.6)	307.4 (1.5)	306.4 (1.8)	307.4 (2.3)	309.3 (1.3)
95	321.2 (1.5)	318.3 (2.3)	316.2 (2.2)	320.2 (1.2)	318.1 (1.6)	318.8 (2.2)	321.4 (1.7)
FEMALE STUDENTS							
Mean	243.7 (1.2)	245.0 (1.3)	246.9 (1.5)	251.8 (1.1)	256.0 (1.0)	254.3 (1.2)	251.8 (1.3)
Standard Deviation	42.8 (0.5)	37.9 (0.7)	35.3 (0.6)	36.1 (0.8)	35.7 (0.8)	35.2 (0.8)	37.1 (0.8)
Percentiles							
5	170.8 (1.6)	180.2 (1.9)	186.3 (2.1)	190.6 (2.1)	192.7 (1.6)	192.4 (1.8)	188.1 (1.6)
10	187.7 (1.8)	195.5 (2.3)	200.5 (2.9)	204.8 (1.5)	208.4 (1.4)	207.2 (2.0)	202.4 (2.2)
25	215.5 (1.7)	219.7 (1.4)	223.4 (1.5)	227.8 (1.6)	233.4 (1.3)	231.3 (1.9)	227.6 (1.5)
50	245.0 (1.2)	246.1 (1.7)	248.0 (1.7)	253.1 (1.2)	258.2 (1.4)	256.3 (1.3)	253.6 (1.6)
75	273.0 (1.5)	271.0 (1.9)	271.0 (1.8)	276.8 (1.6)	280.7 (1.9)	278.9 (1.5)	277.3 (1.6)
90	297.7 (1.0)	292.8 (1.5)	291.3 (1.7)	296.8 (1.1)	299.8 (1.1)	297.7 (2.1)	298.4 (2.1)
95	312.1 (2.2)	305.3 (1.8)	304.0 (3.6)	308.6 (1.4)	311.1 (1.7)	308.4 (2.1)	310.9 (2.0)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.17
(continued)

NAEP 1996 Long-Term Trend Science Results — Age 13

Scale Score Means, Standard Deviations, and Percentiles

	1977	1982	1986	1990	1992	1994	1996
WHITE STUDENTS							
Mean	256.1 (0.8)	257.3 (1.1)	259.2 (1.4)	264.1 (0.9)	267.1 (1.0)	266.5 (1.0)	266.1 (1.2)
Standard Deviation	39.5 (0.3)	35.7 (0.6)	33.6 (0.8)	33.8 (0.5)	31.8 (0.6)	32.1 (0.8)	34.2 (0.6)
Percentiles							
5	190.8 (0.9)	198.0 (1.7)	203.5 (2.7)	208.6 (1.6)	212.6 (2.2)	211.9 (1.6)	208.9 (2.4)
10	205.2 (1.2)	210.8 (1.7)	215.8 (1.5)	220.4 (1.2)	225.7 (1.6)	225.3 (1.2)	221.9 (2.3)
25	229.3 (1.3)	233.2 (1.2)	237.0 (1.9)	241.3 (0.9)	246.1 (1.1)	245.3 (1.1)	243.5 (1.2)
50	256.3 (0.8)	257.6 (1.3)	259.2 (2.0)	264.5 (1.1)	267.8 (1.1)	267.3 (1.3)	266.6 (1.0)
75	282.9 (0.7)	281.5 (1.1)	282.3 (1.9)	287.0 (1.7)	289.0 (1.2)	288.6 (1.5)	289.4 (1.0)
90	306.6 (0.9)	302.7 (1.6)	302.2 (1.9)	307.1 (1.4)	307.1 (1.6)	307.1 (1.8)	309.3 (1.3)
95	320.8 (1.1)	316.2 (1.7)	313.9 (2.1)	319.4 (1.3)	318.0 (1.4)	317.6 (2.7)	321.2 (2.0)
BLACK STUDENTS							
Mean	208.1 (2.4)	217.1 (1.3)	221.6 (2.5)	225.7 (3.1)	224.4 (2.7)	223.9 (4.2)	225.8 (2.2)
Standard Deviation	39.7 (0.9)	34.6 (1.2)	33.0 (0.9)	34.3 (1.7)	37.1 (1.3)	35.7 (2.6)	35.2 (1.2)
Percentiles							
5	144.3 (3.2)	160.3 (3.1)	167.8 (1.7)	169.7 (5.5)	162.1 (3.7)	167.7 (5.9)	168.1 (5.7)
10	157.7 (2.4)	173.0 (3.1)	180.1 (2.2)	181.8 (6.1)	177.0 (3.8)	179.7 (5.5)	180.4 (2.8)
25	180.5 (2.2)	193.7 (2.4)	198.3 (3.0)	202.3 (3.7)	198.9 (3.6)	198.0 (3.6)	201.4 (3.1)
50	207.4 (2.5)	216.8 (1.3)	221.2 (2.8)	225.7 (3.0)	223.8 (2.4)	222.6 (5.3)	224.8 (2.4)
75	234.8 (2.6)	240.7 (2.2)	243.5 (3.6)	249.1 (2.6)	251.4 (3.6)	246.9 (4.2)	250.3 (2.8)
90	259.5 (3.4)	262.2 (3.5)	264.4 (4.9)	269.0 (4.2)	272.0 (2.7)	271.9 (7.0)	270.8 (4.1)
95	274.6 (2.7)	274.7 (1.9)	276.8 (2.5)	283.2 (3.7)	286.0 (7.6)	286.5 (13.3)	285.4 (4.6)
HISPANIC STUDENTS							
Mean	213.4 (1.9)	225.5 (3.9)	226.1 (3.1)	231.6 (2.6)	237.5 (2.6)	232.1 (2.4)	231.8 (2.5)
Standard Deviation	40.4 (1.2)	36.2 (1.1)	34.2 (1.2)	36.6 (1.0)	34.0 (1.2)	34.9 (1.1)	35.7 (0.8)
Percentiles							
5	147.1 (3.5)	166.3 (4.9)	171.1 (5.6)	173.7 (4.7)	180.3 (3.7)	175.2 (3.1)	174.1 (2.9)
10	161.4 (3.0)	179.4 (4.1)	181.3 (4.5)	185.3 (4.5)	193.0 (6.4)	187.3 (1.8)	186.0 (3.6)
25	185.8 (3.5)	200.7 (3.6)	201.6 (5.5)	205.9 (4.1)	215.2 (3.8)	206.9 (3.3)	207.1 (3.5)
50	213.3 (2.5)	225.9 (4.4)	225.6 (3.8)	230.9 (3.3)	237.9 (4.5)	231.4 (2.7)	231.4 (4.1)
75	240.3 (3.5)	249.3 (5.1)	249.8 (3.4)	256.4 (5.1)	260.9 (3.4)	257.8 (5.0)	256.5 (2.8)
90	265.8 (2.0)	271.2 (5.1)	269.9 (3.5)	280.0 (5.9)	281.8 (2.5)	276.8 (7.1)	279.8 (4.3)
95	282.1 (4.4)	284.8 (6.1)	283.0 (3.8)	294.2 (2.8)	292.1 (4.2)	289.7 (6.8)	292.5 (3.4)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.18

NAEP 1996 Long-Term Trend Science Results — Age 17

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD

	1977	1982	1986	1990	1992	1994	1996
TOTAL SAMPLE							
Mean	289.5 (1.0)	283.3 (1.2)	288.5 (1.4)	290.4 (1.1)	294.1 (1.3)	294.0 (1.6)	295.6 (1.2)
Standard Deviation	45.0 (0.4)	46.7 (0.7)	44.4 (1.0)	46.2 (0.6)	44.7 (0.8)	45.6 (1.1)	45.2 (0.9)
Percentiles							
5	212.6 (1.3)	203.2 (2.2)	211.8 (2.4)	209.9 (2.3)	217.7 (2.1)	212.3 (4.3)	216.8 (2.8)
10	231.3 (1.4)	221.5 (1.9)	229.5 (2.4)	228.8 (2.0)	234.2 (2.5)	232.4 (4.3)	235.1 (1.1)
25	260.6 (1.4)	252.5 (2.1)	259.6 (1.9)	260.3 (1.9)	263.6 (2.3)	264.6 (2.0)	265.9 (2.1)
50	290.8 (1.0)	285.4 (1.0)	290.1 (1.9)	292.2 (1.3)	295.9 (1.5)	297.3 (1.2)	298.2 (1.9)
75	320.1 (0.9)	315.3 (1.6)	319.4 (1.3)	322.7 (1.4)	326.6 (1.3)	326.3 (1.1)	327.3 (1.8)
90	346.2 (1.1)	341.5 (1.1)	344.5 (1.9)	348.3 (1.2)	350.3 (1.9)	350.0 (1.5)	351.7 (2.3)
95	361.5 (1.3)	357.3 (1.4)	359.9 (2.0)	362.9 (1.5)	363.8 (1.2)	363.4 (1.8)	365.3 (4.0)
MALE STUDENTS							
Mean	297.0 (1.2)	291.9 (1.4)	294.9 (1.9)	295.6 (1.3)	299.1 (1.7)	299.5 (2.0)	299.8 (1.7)
Standard Deviation	45.3 (0.6)	47.1 (0.9)	46.6 (1.2)	48.7 (0.9)	46.3 (1.0)	47.3 (1.2)	47.7 (1.0)
Percentiles							
5	219.5 (2.1)	210.3 (2.3)	213.9 (2.8)	210.4 (3.9)	219.0 (3.9)	214.2 (4.7)	214.8 (3.7)
10	238.2 (1.6)	228.9 (2.7)	231.4 (5.0)	229.5 (2.9)	235.5 (4.2)	235.4 (5.7)	234.0 (2.3)
25	267.6 (1.5)	261.1 (1.9)	263.5 (3.0)	263.4 (1.3)	267.4 (3.0)	269.4 (3.3)	268.9 (2.1)
50	298.5 (1.2)	294.3 (1.4)	298.7 (2.8)	297.9 (1.9)	301.3 (2.2)	303.6 (2.2)	303.9 (2.0)
75	328.1 (1.4)	324.8 (2.0)	327.6 (1.6)	329.9 (1.8)	333.6 (1.4)	334.0 (2.2)	333.2 (2.3)
90	353.9 (1.4)	350.6 (1.9)	353.4 (2.8)	356.7 (2.3)	357.2 (1.0)	357.1 (2.8)	358.6 (2.7)
95	368.8 (1.6)	365.3 (1.3)	367.0 (4.6)	372.5 (1.8)	370.4 (1.5)	370.2 (4.7)	373.3 (2.6)
FEMALE STUDENTS							
Mean	282.2 (1.1)	275.2 (1.3)	282.3 (1.5)	285.4 (1.6)	289.0 (1.5)	288.9 (1.7)	291.6 (1.4)
Standard Deviation	43.5 (0.5)	44.8 (0.8)	41.3 (1.1)	43.2 (1.0)	42.3 (1.2)	43.0 (1.3)	42.2 (1.0)
Percentiles							
5	207.5 (1.6)	198.3 (3.6)	209.8 (3.5)	209.2 (3.7)	216.5 (4.2)	211.5 (4.2)	219.3 (1.7)
10	226.1 (2.1)	215.5 (2.6)	228.1 (2.0)	228.2 (4.5)	232.9 (2.8)	230.9 (3.0)	235.8 (2.3)
25	254.5 (1.5)	245.7 (2.1)	256.2 (2.0)	257.7 (2.4)	260.3 (2.4)	261.1 (4.2)	263.3 (3.0)
50	283.8 (1.2)	277.6 (2.0)	283.7 (1.4)	287.7 (2.0)	290.9 (2.1)	292.5 (1.4)	293.3 (1.4)
75	311.5 (1.1)	306.2 (1.2)	310.8 (1.8)	316.2 (2.3)	319.8 (1.9)	318.6 (1.9)	321.7 (2.0)
90	336.3 (1.2)	330.1 (1.0)	333.5 (3.0)	339.6 (2.3)	341.4 (1.9)	341.3 (2.6)	344.1 (2.0)
95	351.2 (1.5)	345.2 (1.5)	348.3 (3.2)	351.5 (1.6)	354.4 (2.2)	355.0 (2.6)	357.1 (3.4)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table A.18
(continued)

NAEP 1996 Long-Term Trend Science Results — Age 17

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD

	1977	1982	1986	1990	1992	1994	1996
WHITE STUDENTS							
Mean	297.7 (0.7)	293.1 (1.0)	297.5 (1.7)	300.9 (1.1)	304.2 (1.3)	306.0 (1.5)	307.0 (1.2)
Standard Deviation	40.5 (0.3)	41.6 (0.5)	40.6 (1.0)	41.1 (0.6)	40.6 (0.9)	39.8 (0.9)	40.4 (1.1)
Percentiles							
5	231.1 (0.9)	223.0 (1.7)	228.3 (2.9)	232.8 (2.3)	234.3 (3.9)	237.7 (4.4)	237.1 (2.4)
10	246.0 (0.7)	239.1 (1.5)	244.5 (3.1)	249.0 (2.0)	251.3 (2.5)	253.9 (3.1)	253.9 (1.8)
25	270.3 (0.8)	265.5 (1.5)	271.0 (2.0)	273.4 (1.5)	276.8 (2.2)	280.5 (1.7)	280.9 (1.6)
50	297.5 (0.7)	293.6 (1.0)	298.7 (1.7)	301.2 (1.2)	306.0 (1.5)	307.6 (1.6)	308.6 (1.4)
75	325.0 (0.9)	321.2 (1.6)	324.9 (1.3)	329.0 (1.6)	333.0 (1.7)	333.8 (1.4)	334.7 (2.0)
90	349.9 (1.0)	346.0 (1.3)	348.9 (3.0)	352.3 (1.3)	355.1 (1.5)	356.1 (2.0)	357.3 (2.3)
95	364.6 (1.4)	360.8 (1.3)	363.5 (2.8)	367.3 (2.0)	368.5 (0.9)	368.8 (4.8)	370.5 (3.3)
BLACK STUDENTS							
Mean	240.2 (1.5)	234.7 (1.7)	252.8 (2.9)	253.0 (4.5)	256.2 (3.2)	256.8 (3.1)	259.8 (2.3)
Standard Deviation	41.6 (0.9)	41.8 (1.3)	40.4 (2.2)	44.7 (2.4)	39.4 (1.4)	40.9 (1.7)	41.1 (1.6)
Percentiles							
5	172.4 (1.5)	166.0 (3.1)	189.3 (4.8)	182.0 (10.1)	191.8 (4.0)	186.2 (5.0)	192.0 (4.7)
10	187.3 (1.9)	180.6 (3.5)	201.6 (4.9)	196.6 (3.1)	206.6 (4.1)	201.9 (3.5)	207.6 (4.9)
25	212.1 (1.4)	206.4 (3.2)	225.0 (4.2)	220.5 (4.3)	230.1 (1.7)	229.1 (5.5)	230.9 (2.4)
50	240.4 (1.8)	234.7 (3.0)	251.9 (5.9)	251.6 (3.0)	255.4 (3.2)	257.9 (3.1)	259.0 (4.4)
75	267.9 (2.0)	262.7 (2.2)	279.5 (3.4)	282.9 (6.0)	282.4 (5.9)	285.1 (5.1)	288.1 (2.8)
90	293.4 (2.6)	288.8 (3.9)	306.0 (4.2)	313.6 (11.3)	308.2 (10.3)	310.4 (3.8)	314.3 (4.1)
95	309.6 (2.6)	305.4 (1.6)	322.8 (5.8)	329.3 (10.2)	324.8 (8.7)	322.1 (4.5)	327.0 (5.3)
HISPANIC STUDENTS							
Mean	262.3 (2.2)	248.7 (2.3)	259.3 (3.8)	261.5 (4.4)	270.2 (5.6)	261.4 (6.7)	268.6 (3.0)
Standard Deviation	41.8 (1.5)	43.4 (2.3)	39.3 (1.7)	44.1 (2.6)	41.6 (2.0)	46.3 (2.0)	43.7 (2.0)
Percentiles							
5	193.7 (5.2)	178.0 (6.1)	194.4 (9.3)	188.7 (6.2)	196.6 (10.5)	186.4 (6.9)	195.8 (4.5)
10	208.4 (4.0)	194.2 (7.2)	209.2 (3.8)	203.9 (11.1)	215.4 (14.6)	199.2 (5.7)	211.8 (7.2)
25	234.3 (3.9)	218.8 (3.3)	232.0 (5.6)	230.6 (3.6)	241.6 (8.6)	226.4 (7.7)	239.2 (3.7)
50	262.4 (2.4)	248.0 (2.5)	258.9 (5.8)	260.5 (5.7)	272.7 (11.0)	262.9 (12.0)	269.6 (3.7)
75	289.5 (5.1)	278.4 (3.4)	285.8 (3.6)	292.6 (10.6)	297.9 (2.8)	295.9 (5.7)	297.8 (7.9)
90	316.9 (4.4)	302.1 (3.4)	309.9 (7.6)	317.4 (5.1)	322.8 (6.7)	321.1 (5.8)	324.0 (2.6)
95	331.3 (4.4)	320.8 (11.0)	324.4 (6.3)	329.5 (9.1)	339.1 (6.0)	335.5 (4.8)	339.8 (12.9)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment

Data Appendix B

Mathematics

Table B.1

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 9
Percentages of students with mathematics scale scores at or above 150

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	96.7(0.3)	97.1(0.3)	97.9(0.3)	99.1(0.2)	99.0(0.2)	99.0(0.2)	99.1(0.2)	+		+	
Gender											
Male	96.2(0.5)	96.5(0.5)	98.0(0.5)	99.0(0.3)	99.0(0.3)	99.1(0.3)	99.1(0.2)	+		+	
Female	97.2(0.3)	97.6(0.3)	97.8(0.4)	99.1(0.3)	99.0(0.3)	98.9(0.3)	99.1(0.4)	+		+	
Race/Ethnicity											
White	98.3(0.2)	98.5(0.3)	98.8(0.2)	99.6(0.2)	99.6(0.1)	99.6(0.2)	99.6(0.1)	+		+	
Black	88.4(1.0)	90.2(1.0)	93.9(1.4)	96.9(0.9)	96.6(1.1)	97.4(1.0)	97.3(0.8)	+		+	
Hispanic	93.0(1.2)	94.3(1.2)	96.4(1.3)	98.0(0.8)	97.2(1.3)	97.2(1.2)	98.1(0.7)	+		+	
Other	98.1(****)	99.2(0.5)	97.4(****)	99.2(****)	99.8(****)	98.1(1.2)	98.7(****)				
Grade											
Below Modal Grade	89.4(0.8)	91.5(1.0)	94.1(0.8)	97.5(0.6)	97.3(0.6)	97.4(0.8)	97.8(0.5)	+		+	
At Modal Grade	99.3(0.2)	99.5(0.1)	99.8(0.1)	99.9(****)	99.9(****)	99.8(0.1)	99.7(0.1)				
Above Modal Grade	99.6(****)	99.8(****)	*****	*****	*****	*****	*****				
Region											
Northeast	97.9(0.4)	98.3(0.4)	98.4(0.5)	99.3(0.3)	99.5(0.2)	99.3(****)	99.6(0.2)	+			
Southeast	94.0(0.6)	94.6(0.8)	97.1(0.7)	98.2(0.7)	98.1(0.7)	99.0(0.4)	98.9(0.4)	+		+	
Central	98.2(0.3)	97.9(0.5)	98.5(0.5)	99.4(0.3)	99.4(0.3)	99.4(0.3)	99.0(0.4)			+	
West	96.2(0.6)	97.5(0.6)	97.5(0.9)	99.3(0.3)	98.8(0.5)	98.4(0.6)	98.9(0.4)	+		+	
Parents' Education Level											
Less Than H.S.	92.2(1.1)	90.9(1.6)	93.9(1.8)	97.9(1.2)	98.1(1.1)	97.2(1.8)	98.5(****)				
Graduated H.S.	97.1(0.4)	97.6(0.4)	97.4(0.5)	98.7(0.4)	98.2(0.6)	98.7(0.5)	98.3(0.6)			+	
Some Education After H.S.	98.5(0.6)	98.2(0.6)	98.9(****)	99.1(0.6)	99.5(0.3)	99.7(****)	99.5(0.3)				
Graduated College	98.8(0.3)	98.6(0.3)	99.0(0.3)	99.5(0.3)	99.3(0.3)	99.3(0.3)	99.6(0.3)			+	
Unknown	95.6(0.5)	96.3(0.5)	97.4(0.6)	99.0(0.3)	98.8(0.4)	98.9(0.4)	98.8(0.2)	+		+	
Type of School											
Public	96.4(0.3)	96.8(0.4)	97.7(0.3)	99.0(0.2)	98.8(0.3)	98.9(0.3)	99.0(0.2)	+		+	
Non-Public	99.0(****)	99.0(0.4)	98.7(0.8)	99.7(****)	99.8(0.1)	99.8(****)	99.6(****)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	99.9(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	86.9(0.9)	88.4(1.2)	91.6(1.1)	96.3(0.8)	95.9(0.9)	96.1(0.9)	96.4(0.7)	+		+	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.2

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 9
Percentages of students with mathematics scale scores at or above 200

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	70.4(0.9)	71.4(1.2)	74.1(1.2)	81.5(1.0)	81.4(0.8)	82.0(0.7)	81.5(0.8)	+		+	
Gender											
Male	68.9(1.0)	68.8(1.3)	74.0(1.4)	80.6(1.0)	81.9(1.0)	82.3(0.9)	82.5(1.1)	+		+	
Female	72.0(1.1)	74.0(1.3)	74.3(1.3)	82.3(1.3)	80.9(1.1)	81.7(0.9)	80.7(0.9)	+		+	
Race/Ethnicity											
White	76.3(1.0)	76.8(1.2)	79.6(1.3)	86.9(0.9)	86.9(0.7)	87.0(0.8)	86.6(0.8)	+		+	
Black	42.0(1.4)	46.1(2.4)	53.4(2.5)	60.0(2.8)	59.8(2.8)	65.9(2.6)	65.3(2.4)	+		+	
Hispanic	54.2(2.8)	55.7(2.3)	57.6(2.9)	68.4(3.0)	65.0(2.9)	63.5(3.1)	67.1(2.1)	+		+	
Other	80.3(3.6)	85.2(3.4)	70.4(8.0)	87.0(5.4)	87.8(3.1)	79.6(3.9)	82.7(3.4)				
Grade											
Below Modal Grade	39.6(1.6)	41.7(2.3)	48.0(1.9)	60.3(1.9)	61.0(1.4)	64.0(1.6)	64.6(1.7)	+		+	
At Modal Grade	81.5(0.9)	84.4(0.9)	87.5(1.1)	92.8(0.9)	93.6(0.5)	91.0(0.8)	90.0(0.7)	+		+	−
Above Modal Grade	85.5(6.6)	93.4(3.4)	*****	*****	*****	*****	*****				
Region											
Northeast	78.7(2.3)	78.0(2.1)	77.9(3.2)	85.9(2.2)	85.5(1.8)	87.0(1.9)	85.4(1.7)			+	
Southeast	60.3(1.8)	62.5(2.3)	70.6(2.7)	75.1(2.8)	72.9(2.0)	80.7(1.0)	78.1(1.7)	+		+	
Central	75.9(1.7)	73.8(2.7)	77.6(2.5)	83.7(1.3)	85.3(1.4)	85.0(1.5)	83.9(1.9)	+		+	
West	65.6(1.7)	71.9(2.2)	70.5(2.9)	81.4(1.8)	81.6(2.1)	76.4(1.6)	79.5(1.4)	+		+	
Parents' Education Level											
Less Than H.S.	51.8(2.7)	51.0(2.6)	50.1(3.9)	63.4(4.7)	71.0(4.1)	62.1(4.5)	71.3(4.7)	+		+	
Graduated H.S.	71.7(1.4)	72.1(1.4)	72.2(2.1)	79.3(1.6)	75.5(1.9)	77.4(1.9)	74.2(2.4)			+	
Some Education After H.S.	80.7(2.0)	77.9(2.5)	80.7(2.7)	85.7(2.3)	87.2(2.0)	90.0(1.9)	88.0(2.0)			+	
Graduated College	82.1(1.3)	80.3(1.5)	82.6(1.2)	87.2(1.3)	86.5(1.0)	87.0(0.8)	87.5(1.2)	+		+	
Unknown	63.6(1.3)	64.9(2.2)	67.7(1.6)	77.1(1.4)	77.7(1.4)	77.5(1.2)	76.4(1.5)	+		+	
Type of School											
Public	68.8(0.9)	69.4(1.2)	72.7(1.4)	80.5(1.1)	79.7(0.9)	80.6(0.8)	80.7(0.8)	+		+	
Non–Public	83.3(1.9)	84.3(2.1)	81.8(2.3)	89.3(1.8)	92.2(1.2)	92.3(1.3)	87.1(1.5)		−	+	
Quartiles											
Upper	99.6(0.1)	99.7(****)	99.9(****)	100.0(****)	99.9(****)	100.0(****)	99.9(****)				
Middle two	82.2(0.6)	84.3(0.7)	89.5(0.9)	95.8(0.5)	95.7(0.4)	96.1(0.5)	95.6(0.6)	+		+	−
Lower	17.7(0.9)	17.5(1.6)	17.6(1.5)	34.3(2.2)	34.1(1.4)	35.7(1.3)	35.8(1.9)	+		+	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table B.3

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 9
Percentages of students with mathematics scale scores at or above 250

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	19.6(0.7)	18.8(1.0)	20.7(0.9)	27.7(0.9)	27.8(0.9)	29.9(1.1)	29.7(1.0)	+		+	
Gender											
Male	19.2(0.6)	18.1(1.1)	20.9(1.1)	27.5(1.0)	29.4(1.2)	31.5(1.6)	32.7(1.7)	+		+	+
Female	19.9(1.0)	19.6(1.1)	20.6(1.3)	27.9(1.3)	26.3(1.5)	28.3(1.3)	26.7(1.1)	+		+	
Race/Ethnicity											
White	22.9(0.9)	21.8(1.1)	24.6(1.0)	32.7(1.0)	32.4(1.0)	35.3(1.3)	35.7(1.4)	+		+	
Black	4.1(0.6)	4.4(0.8)	5.6(0.9)	9.4(1.7)	9.6(1.4)	11.1(1.7)	10.0(1.2)	+		+	
Hispanic	9.2(2.5)	7.8(1.7)	7.3(2.8)	11.3(3.5)	11.7(2.5)	9.7(1.8)	13.8(2.3)				
Other	25.1(3.6)	38.3(4.7)	25.1(6.4)	31.7(3.6)	38.7(5.2)	31.2(5.5)	30.5(4.4)				
Grade											
Below Modal Grade	2.9(0.6)	3.2(0.4)	4.2(0.5)	6.9(0.6)	7.6(0.9)	9.8(1.1)	10.6(0.9)	+		+	+
At Modal Grade	25.4(0.9)	25.4(1.1)	29.1(1.1)	38.9(1.3)	39.9(1.1)	39.8(1.4)	39.2(1.4)	+		+	
Above Modal Grade	42.2(7.5)	62.4(16.3)	*****	*****	*****	*****	*****				
Region											
Northeast	25.9(1.6)	23.8(1.4)	24.8(2.7)	34.4(2.1)	32.4(2.1)	37.2(2.8)	35.6(2.6)	+		+	
Southeast	13.4(0.8)	13.6(1.7)	17.2(2.4)	24.0(2.0)	20.3(1.6)	27.3(2.4)	25.8(2.2)	+		+	
Central	23.2(1.4)	19.9(2.5)	24.7(1.8)	27.5(1.8)	31.4(1.9)	30.3(2.6)	31.6(2.7)	+		+	
West	14.9(1.1)	18.6(1.4)	16.3(2.2)	25.6(1.6)	27.1(2.5)	26.0(1.2)	26.9(1.6)	+		+	
Parents' Education Level											
Less Than H.S.	7.5(1.2)	7.1(1.5)	6.4(2.3)	9.9(2.6)	15.0(2.2)	9.5(2.7)	18.3(3.5)	+		+	
Graduated H.S.	18.8(1.1)	16.4(1.3)	17.4(2.1)	23.6(1.6)	20.5(2.1)	24.0(1.8)	20.4(2.8)				
Some Education After H.S.	29.2(1.7)	23.7(2.9)	26.6(2.6)	35.0(4.2)	36.9(2.4)	36.9(3.8)	37.5(4.2)			+	
Graduated College	30.4(1.3)	27.2(1.3)	29.6(1.4)	36.6(1.7)	34.8(1.4)	37.3(1.4)	39.5(2.1)	+		+	
Unknown	13.4(1.1)	13.6(1.3)	13.3(1.1)	19.7(1.1)	21.7(1.3)	22.5(1.6)	20.4(1.0)	+		+	
Type of School											
Public	18.5(0.7)	17.3(0.9)	19.1(1.1)	26.8(1.0)	26.1(0.9)	27.9(1.2)	28.3(1.1)	+		+	
Non-Public	28.4(2.0)	28.6(2.6)	28.9(2.7)	35.2(3.3)	38.6(2.7)	44.4(4.0)	38.7(3.0)	+		+	
Quartiles											
Upper	59.7(1.4)	60.0(1.6)	67.9(1.4)	79.8(1.3)	79.9(1.3)	83.0(2.1)	82.4(2.2)	+		+	
Middle two	9.3(0.6)	7.7(0.7)	7.5(0.7)	15.5(0.8)	15.6(1.0)	18.1(1.3)	17.8(1.0)	+		+	+
Lower	0.1(****)	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.1(****)	0.1(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.4

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 9
Percentages of students with mathematics scale scores at or above 300

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	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	0.8(0.1)	0.6(0.1)	0.6(0.2)	1.2(0.3)	1.2(0.3)	1.3(0.4)	1.6(0.3)	+		+	
Gender											
Male	0.7(0.2)	0.6(0.1)	0.7(0.3)	1.3(0.4)	1.4(0.3)	1.4(0.4)	2.0(0.5)	+		+	
Female	0.8(0.2)	0.5(0.1)	0.6(0.3)	1.0(0.3)	1.0(0.4)	1.1(0.4)	1.2(0.4)				
Race/Ethnicity											
White	0.9(0.2)	0.6(0.1)	0.8(0.3)	1.5(0.4)	1.4(0.3)	1.5(0.4)	2.0(0.4)	+		+	
Black	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.1(****)	0.0(****)	0.1(****)				
Hispanic	0.2(****)	0.0(****)	0.1(****)	0.2(****)	0.1(****)	0.0(****)	0.2(****)				
Other	1.9(0.9)	3.7(2.1)	0.8(****)	2.0(1.0)	4.0(1.7)	2.3(1.5)	1.7(1.2)				
Grade											
Below Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.2(****)				
At Modal Grade	1.0(0.2)	0.7(0.1)	0.9(0.3)	1.8(0.4)	1.9(0.4)	1.8(0.5)	2.2(0.4)	+		+	
Above Modal Grade	4.9(****)	9.4(6.5)	*****	*****	*****	*****	*****				
Region											
Northeast	1.3(0.5)	0.9(0.3)	1.0(0.4)	2.1(0.7)	1.7(0.7)	2.3(1.0)	2.4(0.9)				
Southeast	0.3(0.2)	0.3(0.1)	0.3(0.2)	1.2(0.6)	0.7(0.2)	0.9(0.5)	1.5(0.6)				
Central	1.1(0.3)	0.6(0.3)	1.0(0.7)	0.6(0.2)	1.4(0.6)	1.1(0.3)	1.4(0.7)				
West	0.4(0.2)	0.6(0.1)	0.2(****)	0.9(0.4)	1.0(0.5)	0.9(0.4)	1.2(0.4)				
Parents' Education Level											
Less Than H.S.	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.5(****)				
Graduated H.S.	0.6(0.2)	0.4(0.2)	0.4(****)	0.4(****)	0.4(****)	0.7(0.4)	0.3(****)				
Some Education After H.S.	1.6(0.6)	0.5(****)	1.2(****)	1.4(0.8)	2.0(0.8)	2.2(1.5)	2.0(0.8)				
Graduated College	1.6(0.5)	1.0(0.3)	1.2(0.5)	2.1(0.5)	1.8(0.5)	1.9(0.6)	2.7(0.6)				
Unknown	0.3(0.1)	0.4(0.2)	0.2(****)	0.5(0.3)	0.7(0.2)	0.5(0.3)	0.6(0.4)				
Type of School											
Public	0.7(0.2)	0.5(0.1)	0.6(0.2)	1.1(0.3)	1.1(0.3)	1.1(0.4)	1.5(0.3)			+	
Non-Public	1.2(0.4)	1.0(0.6)	1.1(0.6)	1.8(1.2)	1.9(0.7)	2.2(0.8)	2.1(1.1)				
Quartiles											
Upper	3.0(0.5)	2.2(0.3)	2.6(0.8)	4.6(1.1)	4.7(1.0)	5.0(1.4)	6.2(1.2)	+		+	
Middle two	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.1(0.0)	0.0(****)	0.0(****)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.5

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 9
Percentages of students with mathematics scale scores at or above 350

	1978	1982	1986	1990	1992	1994	1996	* ‡ L Q
TOTAL	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Gender								
Male	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Female	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Race/Ethnicity								
White	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Black	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Hispanic	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Other	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	
Grade								
Below Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
At Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Above Modal Grade	0.0(****)	0.5(****)	*****	*****	*****	*****	*****	
Region								
Northeast	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Southeast	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Central	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
West	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Parents' Education Level								
Less Than H.S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Graduated H.S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Some Education After H.S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Graduated College	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Unknown	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Type of School								
Public	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Non-Public	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	
Quartiles								
Upper	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Middle two	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.6

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 13
Percentages of students with mathematics scale scores at or above 150

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	99.8(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Gender											
Male	99.7(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)				
Female	99.8(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Race/Ethnicity											
White	100.0(0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Black	98.6(0.4)	99.8(****)	100.0(****)	100.0(****)	99.9(****)	99.9(****)	100.0(****)				
Hispanic	99.6(****)	99.9(****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	99.9(****)				
Other	99.8(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)				
Grade											
Below Modal Grade	99.2(0.2)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)				
At Modal Grade	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Above Modal Grade	100.0(****)	100.0(****)	*****	*****	*****	*****	*****				
Region											
Northeast	99.9(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Southeast	99.4(0.2)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Central	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
West	99.8(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)				
Parents' Education Level											
Less Than H.S.	99.5(0.2)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)				
Graduated H.S.	99.9(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Some Education After H.S.	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Graduated College	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Unknown	99.1(0.3)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)				
Type of School											
Public	99.7(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Non-Public	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	99.0(0.3)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	99.9(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.7

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 13
Percentages of students with mathematics scale scores at or above 200

THE NATION'S REPORT CARD

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	94.6(0.5)	97.7(0.4)	98.6(0.2)	98.5(0.2)	98.7(0.3)	98.5(0.3)	98.8(0.2)	-		+	-
Gender											
Male	93.9(0.5)	97.5(0.6)	98.5(0.3)	98.2(0.3)	98.8(0.4)	98.3(0.4)	98.7(0.3)	+		+	-
Female	95.2(0.5)	98.0(0.3)	98.6(0.3)	98.9(0.2)	98.6(0.2)	98.7(0.3)	98.8(0.3)	+		+	-
Race/Ethnicity											
White	97.6(0.3)	99.1(0.1)	99.3(0.3)	99.4(0.1)	99.6(0.2)	99.3(0.2)	99.6(0.2)	+		+	-
Black	79.7(1.5)	90.2(1.6)	95.4(0.9)	95.4(1.1)	95.0(1.4)	95.6(1.6)	96.2(1.3)	+		+	-
Hispanic	86.4(0.9)	95.9(0.9)	96.9(1.4)	96.8(1.1)	98.1(0.7)	97.1(1.3)	96.2(0.8)	+		+	-
Other	97.3(1.5)	99.1(0.6)	99.6(****)	98.3(1.0)	99.0(****)	99.3(****)	98.7(****)				
Grade											
Below Modal Grade	86.2(1.1)	93.6(1.0)	96.4(0.6)	96.3(0.5)	97.1(0.6)	96.7(0.7)	97.5(0.5)	+		+	-
At Modal Grade	97.9(0.3)	99.4(0.2)	99.6(0.1)	99.8(0.1)	99.7(0.1)	99.6(0.2)	99.4(0.2)	+		+	-
Above Modal Grade	99.2(****)	100.0(****)	*****	*****	*****	*****	*****				
Region											
Northeast	96.5(0.9)	99.0(0.3)	99.2(0.2)	99.1(0.6)	98.6(0.7)	99.5(0.3)	98.9(0.5)				
Southeast	90.1(1.6)	95.6(1.0)	98.3(0.6)	97.8(0.6)	98.0(0.7)	98.2(0.5)	98.4(0.7)	+		+	-
Central	96.8(0.4)	98.6(0.5)	98.4(1.0)	99.0(0.3)	99.3(0.4)	98.7(0.9)	99.2(0.3)	+		+	
West	94.0(0.9)	97.6(0.9)	98.3(0.5)	98.3(0.5)	98.8(0.4)	98.0(0.5)	98.6(0.4)	+		+	-
Parents' Education Level											
Less Than H.S.	89.2(1.1)	95.3(1.2)	96.5(1.6)	96.4(1.3)	98.0(0.9)	96.9(1.6)	96.4(1.4)	+		+	-
Graduated H.S.	96.0(0.4)	98.0(0.4)	98.8(0.5)	98.5(0.5)	98.3(0.7)	98.2(0.5)	98.5(0.5)	+		+	-
Some Education After H.S.	97.6(0.6)	98.6(0.3)	99.3(0.4)	99.7(****)	99.6(0.2)	99.3(0.4)	99.4(****)				
Graduated College	98.8(0.2)	98.9(0.4)	99.2(0.3)	99.3(0.2)	99.3(0.2)	99.6(0.2)	99.2(0.2)				
Unknown	85.5(1.3)	94.1(1.6)	95.2(1.7)	94.2(1.6)	95.4(1.4)	94.9(1.6)	97.7(0.8)	+		+	
Type of School											
Public	94.1(0.5)	97.5(0.4)	98.5(0.3)	98.4(0.2)	98.5(0.3)	98.5(0.3)	98.6(0.2)	+		+	-
Non-Public	99.0(0.4)	99.5(0.3)	98.9(0.6)	99.7(****)	99.9(****)	98.7(****)	99.6(****)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	99.6(0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	79.0(1.2)	91.0(1.2)	94.2(0.8)	94.1(0.8)	94.9(1.0)	94.0(1.2)	95.0(0.8)	+		+	-

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.8

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 13
Percentages of students with mathematics scale scores at or above 250

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	64.9(1.2)	71.4(1.2)	73.3(1.6)	74.7(1.0)	77.9(1.1)	78.1(1.1)	78.6(0.9)	+		+	
Gender											
Male	63.9(1.3)	71.3(1.4)	73.8(1.8)	75.1(1.8)	78.1(1.6)	78.9(1.5)	79.8(1.4)	+		+	
Female	65.9(1.2)	71.4(1.3)	72.7(1.9)	74.4(1.3)	77.7(1.1)	77.3(1.0)	77.4(1.1)	+		+	
Race/Ethnicity											
White	72.9(0.9)	78.3(0.9)	78.9(1.7)	82.0(1.0)	84.9(1.1)	85.5(0.9)	86.4(1.0)	+		+	
Black	28.7(2.1)	37.9(2.5)	49.0(3.7)	48.7(3.6)	51.0(2.7)	51.0(3.9)	53.7(2.6)	+		+	
Hispanic	36.0(2.9)	52.2(2.5)	56.0(5.0)	56.7(3.3)	63.3(2.7)	59.2(2.2)	58.3(2.3)	+		+	–
Other	68.6(4.3)	75.3(5.9)	85.7(4.7)	76.5(5.0)	82.9(3.2)	84.8(3.0)	81.1(3.5)				
Grade											
Below Modal Grade	39.2(1.6)	46.0(2.0)	51.3(2.1)	54.2(1.7)	61.6(2.1)	63.1(1.7)	66.7(1.9)	+		+	
At Modal Grade	75.2(1.1)	81.2(1.0)	83.9(1.3)	86.5(0.9)	87.6(0.8)	86.9(0.9)	85.1(0.9)	+		+	–
Above Modal Grade	88.7(5.1)	92.3(4.7)	*****	*****	*****	*****	*****				
Region											
Northeast	73.4(2.4)	79.4(1.5)	80.5(2.2)	78.2(2.3)	78.4(2.5)	86.7(1.4)	79.5(3.1)				
Southeast	53.5(3.6)	60.3(2.0)	68.6(2.3)	70.1(2.4)	74.8(2.7)	73.9(3.1)	75.3(2.1)	+		+	
Central	70.4(1.9)	75.9(2.4)	70.7(6.3)	77.9(2.8)	80.6(1.8)	78.9(3.4)	85.0(1.9)	+		+	
West	60.5(2.4)	69.0(3.0)	73.9(2.2)	72.9(1.8)	77.7(2.0)	74.7(1.8)	75.7(1.7)	+		+	–
Parents' Education Level											
Less Than H.S.	44.6(1.7)	51.2(2.3)	54.7(3.9)	55.8(2.6)	59.7(2.3)	57.2(4.4)	56.1(4.4)			+	
Graduated H.S.	64.9(1.2)	66.7(1.0)	68.7(1.5)	68.2(1.9)	67.9(2.4)	71.6(1.6)	73.8(1.7)	+		+	
Some Education After H.S.	75.5(1.5)	80.5(1.3)	80.7(1.9)	84.6(1.5)	85.8(1.3)	82.2(1.7)	83.6(1.5)	+		+	
Graduated College	83.4(1.1)	84.2(1.5)	83.5(1.6)	84.1(1.1)	87.0(1.0)	87.6(1.1)	85.5(1.1)				
Unknown	39.3(1.5)	52.7(3.9)	45.2(4.4)	46.3(3.6)	54.7(3.0)	53.9(3.6)	62.6(3.2)	+		+	
Type of School											
Public	63.3(1.2)	69.7(1.3)	72.9(1.7)	73.3(1.2)	76.3(1.2)	76.7(1.2)	77.2(0.9)	+		+	
Non-Public	80.8(1.7)	85.1(1.6)	81.9(3.3)	87.0(2.0)	89.7(2.1)	88.5(2.6)	89.3(3.5)			+	
Quartiles											
Upper	98.8(0.3)	99.8(0.1)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	99.9(****)				
Middle two	74.0(0.6)	83.9(0.8)	88.2(1.1)	89.6(0.8)	93.1(0.9)	93.5(0.7)	93.6(0.9)	+		+	–
Lower	12.9(0.6)	17.8(0.9)	16.7(1.5)	19.7(1.7)	25.5(2.2)	25.3(1.7)	26.7(1.2)	+		+	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

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***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.9

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 13
Percentages of students with mathematics scale scores at or above 300

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	18.0(0.7)	17.4(0.9)	15.8(1.0)	17.3(1.0)	18.9(1.0)	21.3(1.4)	20.6(1.2)			+	+
Gender											
Male	18.4(0.9)	18.9(1.2)	17.6(1.1)	19.0(1.2)	20.7(1.1)	23.9(1.6)	23.0(1.6)	+		+	
Female	17.5(0.7)	15.9(1.0)	14.1(1.3)	15.7(1.0)	17.2(1.4)	18.7(1.4)	18.4(1.5)				+
Race/Ethnicity											
White	21.4(0.7)	20.5(1.0)	18.6(1.2)	21.0(1.2)	22.8(1.3)	25.6(1.6)	25.4(1.5)			+	+
Black	2.3(0.5)	2.9(1.0)	4.0(1.4)	3.9(1.6)	4.0(0.7)	6.4(2.4)	4.8(1.1)				
Hispanic	4.0(1.0)	6.3(1.0)	5.5(1.1)	6.4(1.7)	7.0(1.2)	6.4(1.8)	6.7(1.2)				
Other	27.4(4.8)	24.2(3.9)	28.1(6.2)	22.2(8.3)	30.1(4.7)	32.4(4.5)	28.8(5.6)				
Grade											
Below Modal Grade	4.5(0.5)	4.3(0.7)	4.0(0.7)	4.5(0.6)	7.3(1.0)	8.6(1.1)	10.9(1.3)	+		+	+
At Modal Grade	23.2(0.9)	21.9(0.9)	21.4(1.1)	24.6(1.3)	25.6(1.4)	28.5(1.6)	25.6(1.5)			+	
Above Modal Grade	47.9(9.2)	60.6(7.2)	*****	*****	*****	*****	*****				
Region											
Northeast	24.2(1.9)	23.9(2.1)	22.5(2.4)	21.3(2.4)	19.7(2.4)	30.3(2.6)	21.1(2.7)				
Southeast	11.6(1.5)	10.2(1.3)	10.0(1.3)	13.7(1.4)	18.2(2.7)	15.3(1.7)	16.1(2.3)			+	
Central	20.4(1.3)	20.1(1.8)	12.8(2.6)	17.4(2.4)	20.6(1.7)	21.2(3.3)	26.0(1.9)				+
West	14.8(1.2)	15.1(1.8)	18.3(2.3)	16.9(1.8)	17.3(1.4)	19.7(1.8)	19.9(3.1)				
Parents' Education Level											
Less Than H.S.	5.8(0.6)	5.6(0.7)	4.5(1.3)	4.7(1.4)	4.4(1.6)	5.8(1.4)	5.8(2.0)				
Graduated H.S.	14.8(0.7)	10.8(0.7)	8.0(0.9)	8.7(0.9)	9.6(1.2)	11.3(1.1)	11.6(1.2)				+
Some Education After H.S.	22.2(1.3)	20.4(1.2)	16.9(2.2)	19.8(1.8)	19.3(1.6)	22.2(2.1)	21.1(1.9)				
Graduated College	32.6(1.5)	30.0(1.6)	26.0(1.4)	26.9(1.5)	28.2(1.5)	31.1(2.1)	29.8(2.0)				+
Unknown	5.4(0.9)	7.2(1.9)	4.3(1.9)	4.2(1.3)	6.1(1.6)	5.8(1.3)	7.2(1.4)				
Type of School											
Public	17.0(0.8)	16.4(1.0)	15.6(1.0)	16.7(1.1)	18.0(1.0)	20.0(1.4)	19.2(1.3)			+	
Non-Public	26.9(1.8)	26.3(3.1)	22.0(6.8)	23.2(2.5)	25.9(3.7)	30.7(3.7)	31.6(4.8)				
Quartiles											
Upper	56.9(0.9)	59.1(1.5)	59.6(1.9)	63.2(1.6)	67.4(1.6)	73.5(2.6)	72.9(2.3)	+		+	+
Middle two	7.4(0.4)	5.3(0.4)	1.9(0.6)	3.1(0.5)	4.2(0.6)	5.8(0.9)	6.1(0.5)				+
Lower	0.1(0.0)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.10

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 13
Percentages of students with mathematics scale scores at or above 350

THE NATION'S REPORT CARD

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	1.0(0.2)	0.5(0.1)	0.4(0.1)	0.4(0.1)	0.4(0.2)	0.6(0.2)	0.6(0.1)				+
Gender											
Male	1.1(0.2)	0.7(0.2)	0.5(0.2)	0.5(0.2)	0.5(0.2)	0.8(0.3)	0.8(0.2)				+
Female	0.9(0.2)	0.4(0.2)	0.3(0.1)	0.2(0.1)	0.3(****)	0.5(0.3)	0.5(0.2)				
Race/Ethnicity											
White	1.2(0.2)	0.6(0.1)	0.4(0.1)	0.4(0.2)	0.4(0.2)	0.7(0.3)	0.8(0.2)				+
Black	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.1(****)	0.3(****)	0.1(****)				
Hispanic	0.1(****)	0.0(****)	0.2(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)				
Other	3.7(2.1)	1.0(0.5)	1.4(****)	0.5(****)	1.2(****)	1.8(1.0)	1.8(****)				
Grade											
Below Modal Grade	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.1(****)				
At Modal Grade	1.3(0.2)	0.6(0.1)	0.5(0.2)	0.5(0.2)	0.5(0.1)	0.8(0.3)	0.7(0.2)				+
Above Modal Grade	9.0(4.6)	7.7(4.2)	*****	*****	*****	*****	*****				
Region											
Northeast	1.3(0.5)	1.0(0.4)	0.7(0.3)	0.7(0.4)	0.4(****)	1.4(0.6)	0.7(0.3)				
Southeast	0.5(0.2)	0.1(****)	0.2(****)	0.1(****)	0.5(****)	0.2(****)	0.3(0.1)				
Central	1.2(0.3)	0.6(0.2)	0.3(****)	0.3(0.2)	0.3(0.2)	0.7(****)	0.8(0.2)				
West	0.8(0.3)	0.3(0.1)	0.4(****)	0.3(0.2)	0.3(0.1)	0.4(0.2)	0.7(0.4)				
Parents' Education Level											
Less Than H.S.	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				
Graduated H.S.	0.5(0.1)	0.1(0.1)	0.1(****)	0.0(****)	0.1(****)	0.1(****)	0.3(****)				
Some Education After H.S.	1.1(0.2)	0.5(0.2)	0.5(****)	0.4(0.3)	0.2(0.2)	1.0(0.6)	0.4(****)				
Graduated College	2.6(0.6)	1.2(0.4)	0.7(0.3)	0.7(0.3)	0.7(0.4)	1.0(0.4)	1.0(0.3)			–	+
Unknown	0.1(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.1(****)	0.1(****)				
Type of School											
Public	0.9(0.2)	0.5(0.1)	0.4(0.1)	0.3(0.1)	0.3(0.2)	0.6(0.2)	0.6(0.1)				+
Non-Public	1.4(0.4)	1.0(0.3)	0.1(****)	0.7(0.4)	0.7(0.4)	1.0(****)	1.0(0.6)				
Quartiles											
Upper	3.9(0.6)	2.1(0.4)	1.5(0.5)	1.4(0.5)	1.5(0.6)	2.5(0.9)	2.6(0.6)				+
Middle two	0.0(0.0)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.11

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 17
Percentages of students with mathematics scale scores at or above 150

THE NATION'S REPORT CARD naep

	1978	1982	1986	1990	1992	1994	1996	* ‡ L Q
TOTAL	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Gender								
Male	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Female	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Race/Ethnicity								
White	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Black	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Hispanic	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Other	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Grade								
Below Modal Grade	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
At Modal Grade	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Above Modal Grade	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Region								
Northeast	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Southeast	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Central	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
West	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Parents' Education Level								
Less Than H.S.	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Graduated H.S.	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Some Education After H.S.	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Graduated College	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Unknown	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Type of School								
Public	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Non-Public	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Quartiles								
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Lower	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.12

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 17

Percentages of students with mathematics scale scores at or above 200

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	99.8(0.1)	99.9(0.0)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Gender											
Male	99.9(0.1)	100.0(****)	99.9(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)				
Female	99.7(0.1)	99.9(0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Race/Ethnicity											
White	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Black	98.8(0.3)	99.7(0.2)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)				
Hispanic	99.3(0.4)	99.8(****)	99.4(****)	99.6(****)	100.0(****)	100.0(****)	99.9(****)				
Other	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Grade											
Below Modal Grade	99.1(0.3)	99.7(0.2)	99.8(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)				
At Modal Grade	99.9(0.0)	100.0(0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Above Modal Grade	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Region											
Northeast	99.9(0.1)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Southeast	99.6(0.2)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Central	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
West	99.8(0.1)	99.9(****)	99.8(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)				
Parents' Education Level											
Less Than H.S.	99.5(0.3)	99.8(0.1)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	99.8(****)				
Graduated H.S.	99.8(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Some Education After H.S.	99.9(0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Graduated College	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Unknown	99.1(0.4)	99.5(****)	100.0(****)	99.3(****)	100.0(****)	100.0(****)	100.0(****)				
Type of School											
Public	99.8(0.1)	99.9(0.0)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Non-Public	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	99.3(0.2)	99.7(0.1)	99.8(****)	99.8(****)	100.0(****)	100.0(****)	99.9(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.13

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 17
Percentages of students with mathematics scale scores at or above 250

THE NATION'S REPORT CARD

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	92.0(0.5)	93.0(0.5)	95.6(0.5)	96.0(0.5)	96.6(0.5)	96.5(0.5)	96.8(0.4)	+		+	-
Gender											
Male	93.0(0.5)	93.9(0.6)	96.1(0.6)	95.8(0.8)	96.9(0.6)	97.3(0.6)	97.0(0.7)	+		+	
Female	91.0(0.6)	92.1(0.6)	95.1(0.7)	96.2(0.8)	96.3(0.8)	96.0(0.6)	96.7(0.6)	+		+	
Race/Ethnicity											
White	95.6(0.3)	96.2(0.3)	98.0(0.4)	97.6(0.3)	98.3(0.4)	98.4(0.4)	98.7(0.4)	+		+	
Black	70.7(1.7)	76.4(1.5)	85.6(2.5)	92.4(2.2)	89.6(2.5)	90.6(1.8)	90.6(1.3)	+		+	-
Hispanic	78.3(2.3)	81.4(1.9)	89.3(2.5)	85.8(4.2)	94.1(2.2)	91.8(3.6)	92.2(2.2)	+		+	
Other	94.5(2.6)	97.2(1.7)	91.9(2.7)	97.9(****)	96.5(1.7)	97.0(****)	97.4(1.2)				
Grade											
Below Modal Grade	75.5(1.3)	79.0(1.9)	84.2(2.3)	88.2(1.8)	90.0(1.7)	89.1(2.0)	91.6(1.3)	+		+	
At Modal Grade	94.8(0.5)	95.5(0.4)	98.0(0.4)	98.1(0.4)	98.7(0.3)	98.4(0.3)	98.6(0.4)	+		+	-
Above Modal Grade	95.7(0.6)	96.4(0.8)	97.6(1.2)	98.5(0.9)	99.0(0.7)	98.9(****)	97.3(1.3)				
Region											
Northeast	93.8(0.6)	95.2(0.9)	96.6(0.9)	94.5(1.7)	97.3(0.7)	97.3(0.8)	97.5(1.0)	+		+	
Southeast	87.6(1.3)	89.2(1.7)	94.1(1.0)	96.2(0.7)	95.6(1.7)	95.6(0.7)	95.7(0.7)	+		+	
Central	94.9(0.8)	94.8(0.5)	96.8(0.9)	97.8(0.6)	97.9(0.7)	97.3(0.8)	99.0(0.6)	+		+	
West	90.5(1.1)	91.8(1.0)	94.8(1.1)	95.5(1.0)	95.8(1.2)	96.1(1.4)	95.4(0.9)	+		+	
Parents' Education Level											
Less Than H.S.	82.1(1.1)	84.0(1.4)	88.0(2.1)	90.5(2.5)	89.9(3.7)	90.1(3.9)	87.8(3.3)				
Graduated H.S.	90.7(0.6)	92.7(0.6)	93.9(1.2)	93.8(1.2)	94.8(0.9)	94.6(1.1)	95.2(0.9)	+		+	
Some Education After H.S.	95.5(0.5)	96.2(0.7)	97.9(0.6)	98.5(0.7)	98.5(0.4)	98.0(0.8)	98.3(0.8)	+		+	
Graduated College	97.7(0.3)	97.8(0.4)	98.3(0.4)	98.6(0.5)	98.0(0.6)	98.6(0.4)	98.5(0.4)				
Unknown	77.2(2.0)	74.4(3.1)	88.0(4.1)	80.1(4.1)	90.9(4.7)	87.0(5.1)	89.6(5.9)			+	
Type of School											
Public	91.7(0.5)	92.5(0.6)	95.5(0.5)	95.8(0.6)	96.3(0.6)	96.2(0.5)	96.7(0.5)	+		+	
Non-Public	97.1(0.6)	98.1(0.5)	99.4(****)	98.2(1.2)	99.5(****)	98.8(0.6)	98.5(0.8)				
Quartiles											
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	99.4(0.2)	99.7(0.1)	99.9(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	69.1(1.0)	72.5(1.3)	82.5(1.8)	84.5(2.0)	86.5(1.8)	86.2(1.8)	87.2(1.6)	+		+	-

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.14

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 17
Percentages of students with mathematics scale scores at or above 300

THE NATION'S REPORT CARD

	1978	1982	1986	1990	1992	1994	1996	*	‡	L	Q
TOTAL	51.5(1.1)	48.5(1.3)	51.7(1.4)	56.1(1.4)	59.1(1.3)	58.6(1.4)	60.1(1.7)	+		+	
Gender											
Male	55.1(1.2)	51.9(1.5)	54.6(1.8)	57.6(1.4)	60.5(1.8)	60.2(2.1)	62.7(1.8)	+		+	
Female	48.2(1.3)	45.3(1.4)	48.9(1.7)	54.7(1.8)	57.7(1.6)	57.2(1.4)	57.6(2.2)	+		+	
Race/Ethnicity											
White	57.6(1.1)	54.7(1.4)	59.1(1.7)	63.2(1.6)	66.4(1.4)	67.0(1.4)	68.7(2.2)	+		+	
Black	16.8(1.6)	17.1(1.5)	20.8(2.8)	32.8(4.5)	29.8(3.9)	29.8(3.4)	31.2(2.5)	+		+	
Hispanic	23.4(2.7)	21.6(2.2)	26.5(4.5)	30.1(3.1)	39.2(4.9)	38.3(5.5)	40.1(3.5)	+		+	
Other	64.7(4.9)	62.0(6.8)	54.9(8.2)	61.6(7.0)	69.8(4.8)	66.4(6.6)	63.5(7.2)				
Grade											
Below Modal Grade	20.1(1.1)	18.5(1.5)	19.8(2.2)	24.4(2.1)	27.2(2.6)	28.2(2.6)	36.5(2.2)	+		+	+
At Modal Grade	56.5(1.2)	53.5(1.3)	58.3(1.5)	65.1(1.4)	69.0(1.2)	66.1(1.4)	67.6(2.3)	+		+	
Above Modal Grade	61.4(1.6)	58.2(2.0)	56.8(4.4)	63.3(3.7)	70.6(3.8)	72.0(3.8)	66.1(4.3)			+	
Region											
Northeast	59.2(2.1)	55.6(2.5)	58.9(2.9)	55.7(3.2)	64.8(2.8)	66.6(3.8)	61.3(4.7)				
Southeast	42.4(1.9)	41.7(2.6)	45.5(2.0)	49.4(2.8)	51.6(2.8)	51.3(2.5)	53.1(3.0)	+		+	
Central	57.1(2.3)	52.0(2.3)	53.9(2.6)	65.3(3.3)	68.5(3.0)	60.2(3.2)	69.6(3.5)	+		+	
West	45.3(2.3)	43.3(2.7)	48.3(4.1)	53.8(2.6)	53.1(3.3)	57.1(2.6)	56.6(3.3)			+	
Parents' Education Level											
Less Than H.S.	26.1(1.4)	23.6(1.6)	21.1(2.9)	29.7(3.4)	30.9(4.2)	27.1(3.8)	22.0(3.0)				
Graduated H.S.	43.2(1.2)	41.0(1.2)	39.8(1.7)	41.6(1.7)	47.2(2.7)	42.8(2.7)	46.8(4.3)				
Some Education After H.S.	57.5(1.4)	55.8(1.4)	55.4(2.5)	61.0(2.0)	60.1(2.8)	58.1(2.0)	60.2(2.3)				
Graduated College	71.7(1.4)	66.8(1.5)	68.2(2.1)	71.1(1.9)	71.2(1.7)	74.0(1.9)	72.5(2.1)				
Unknown	23.9(2.2)	17.9(2.0)	18.3(4.3)	23.3(5.2)	35.3(6.2)	28.0(5.1)	32.4(6.5)				
Type of School											
Public	50.6(1.2)	46.9(1.3)	50.7(1.6)	55.0(1.3)	56.9(1.2)	56.2(1.3)	59.0(1.8)	+		+	
Non-Public	67.7(3.3)	66.3(2.4)	75.1(10.6)	71.0(7.9)	79.5(3.7)	75.7(4.3)	71.5(6.4)				
Quartiles											
Upper	97.6(0.4)	98.5(0.4)	99.6(0.3)	99.5(0.2)	99.7(****)	99.6(0.3)	99.7(****)				
Middle two	53.1(0.6)	47.3(1.1)	53.1(1.8)	61.5(1.6)	67.1(1.4)	66.0(1.3)	68.0(2.0)	+		+	+
Lower	2.4(0.3)	1.0(0.3)	1.2(0.6)	2.0(0.7)	2.5(0.7)	2.8(1.0)	2.4(0.7)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.15

NAEP 1996 Mathematics Long-Term Trend Assessment — Age 17
Percentages of students with mathematics scale scores at or above 350

	1978	1982	1986	1990	1992	1994	1996	* ‡ L Q
TOTAL	7.3(0.4)	5.5(0.4)	6.5(0.5)	7.2(0.6)	7.2(0.6)	7.4(0.8)	7.4(0.8)	
Gender								
Male	9.5(0.6)	6.9(0.7)	8.4(0.9)	8.8(0.8)	9.1(0.7)	9.3(1.0)	9.5(1.3)	
Female	5.2(0.7)	4.1(0.4)	4.7(0.6)	5.6(0.8)	5.2(0.8)	5.5(0.9)	5.3(0.8)	
Race/Ethnicity								
White	8.5(0.5)	6.4(0.5)	7.9(0.7)	8.3(0.7)	8.7(0.9)	9.4(1.1)	9.2(1.0)	
Black	0.5(0.2)	0.5(0.3)	0.2(****)	2.0(1.0)	0.9(****)	0.4(****)	0.9(****)	
Hispanic	1.4(0.6)	0.7(0.4)	1.1(****)	1.9(0.8)	1.2(****)	1.4(****)	1.8(****)	
Other	15.4(3.2)	9.5(2.7)	10.8(6.4)	15.9(4.3)	16.9(5.7)	12.1(3.6)	13.7(5.0)	
Grade								
Below Modal Grade	0.7(0.3)	0.7(0.3)	0.4(****)	1.2(0.5)	0.6(****)	1.6(0.5)	1.6(0.8)	
At Modal Grade	8.1(0.5)	6.1(0.5)	7.2(0.6)	8.9(0.7)	8.9(0.8)	8.6(0.8)	9.0(1.1)	+
Above Modal Grade	11.4(0.9)	8.6(1.4)	13.5(2.4)	8.4(1.8)	14.0(2.9)	11.5(4.0)	10.9(2.2)	
Region								
Northeast	10.3(1.0)	7.3(1.3)	8.9(1.9)	7.3(1.0)	10.3(1.7)	12.4(2.2)	8.2(1.9)	
Southeast	5.1(0.5)	4.0(0.7)	4.9(1.1)	6.8(1.8)	4.9(0.9)	5.0(1.0)	6.0(1.3)	
Central	8.4(1.0)	6.9(0.8)	6.6(1.1)	9.3(1.1)	7.9(1.2)	6.7(1.1)	10.0(1.9)	
West	5.0(0.6)	3.3(0.4)	5.6(1.4)	5.5(1.0)	6.3(1.2)	6.0(1.6)	5.5(1.4)	
Parents' Education Level								
Less Than H.S.	1.4(0.3)	1.0(0.4)	0.5(****)	1.2(****)	0.8(****)	0.7(****)	0.2(****)	
Graduated H.S.	3.9(0.3)	3.1(0.4)	2.7(0.6)	2.4(0.6)	2.9(1.2)	2.3(0.5)	3.2(1.2)	
Some Education After H.S.	7.4(0.7)	5.9(0.6)	6.9(0.9)	6.7(1.0)	5.8(0.8)	4.0(1.1)	4.8(1.0)	–
Graduated College	14.1(0.9)	10.2(1.1)	11.0(1.1)	12.5(1.2)	11.7(1.2)	13.2(1.3)	12.1(1.3)	
Unknown	1.4(0.6)	0.8(0.4)	1.0(****)	0.4(****)	2.0(****)	0.5(****)	0.2(****)	
Type of School								
Public	7.0(0.4)	5.2(0.4)	6.1(0.5)	6.5(0.5)	6.7(0.7)	6.4(0.7)	7.1(0.7)	
Non-Public	12.9(2.7)	8.2(1.4)	16.3(9.1)	15.7(5.3)	12.2(2.7)	14.5(3.5)	10.4(4.0)	
Quartiles								
Upper	27.2(1.0)	21.5(1.3)	25.9(1.6)	27.7(1.7)	28.3(2.4)	29.0(2.4)	27.6(2.3)	
Middle two	1.0(0.2)	0.2(0.1)	0.1(****)	0.2(0.2)	0.3(****)	0.3(0.2)	0.5(0.3)	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1978.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.16

NAEP 1996 Long-Term Trend Mathematics Results — Age 9

Scale Score Means, Standard Deviations, and Percentiles

	1978	1982	1986	1990	1992	1994	1996
TOTAL SAMPLE							
Mean	218.6 (0.8)	219.0 (1.1)	221.7 (1.0)	229.6 (0.8)	229.6 (0.8)	231.1 (0.8)	231.0 (0.8)
Standard Deviation	36.0 (0.3)	34.8 (0.4)	34.0 (0.5)	32.9 (0.5)	33.1 (0.5)	33.2 (0.5)	33.8 (0.6)
Percentiles							
5	157.1 (1.0)	159.3 (1.8)	163.0 (1.3)	173.3 (2.6)	172.2 (1.6)	174.1 (1.4)	173.9 (1.1)
10	171.1 (1.2)	173.2 (1.8)	176.7 (1.5)	185.8 (2.2)	185.4 (1.2)	186.8 (1.4)	186.6 (1.5)
25	194.6 (1.0)	196.0 (1.1)	199.0 (1.6)	207.8 (1.3)	207.9 (1.2)	209.0 (0.9)	208.2 (1.0)
50	220.1 (1.0)	220.4 (1.2)	223.3 (1.1)	231.1 (0.9)	231.0 (0.8)	232.5 (1.1)	231.7 (0.8)
75	243.7 (0.9)	243.3 (1.4)	245.6 (1.2)	252.5 (0.7)	252.6 (0.8)	254.7 (0.8)	254.5 (1.0)
90	264.0 (1.2)	262.7 (1.0)	264.2 (1.3)	271.0 (1.0)	270.9 (1.3)	272.4 (1.0)	274.0 (1.7)
95	275.7 (1.2)	273.8 (1.3)	275.5 (1.2)	282.1 (1.3)	281.7 (1.2)	282.9 (1.1)	285.3 (1.5)
MALE STUDENTS							
Mean	217.4 (0.7)	217.1 (1.2)	221.7 (1.1)	229.1 (0.9)	230.8 (1.0)	232.2 (1.0)	232.9 (1.2)
Standard Deviation	36.7 (0.5)	35.8 (0.5)	34.3 (0.8)	33.5 (0.6)	33.5 (0.6)	33.6 (0.6)	34.6 (0.9)
Percentiles							
5	154.9 (2.3)	156.4 (2.1)	162.7 (2.0)	171.8 (2.5)	172.7 (1.5)	174.7 (2.1)	174.5 (2.5)
10	169.0 (1.3)	170.2 (1.4)	176.1 (1.7)	184.6 (2.1)	186.1 (1.4)	186.8 (1.9)	187.8 (2.0)
25	192.8 (1.0)	193.0 (1.5)	198.6 (1.6)	206.7 (1.2)	208.9 (1.6)	209.7 (1.3)	209.7 (1.5)
50	218.4 (0.9)	218.6 (1.7)	223.0 (1.0)	230.4 (1.0)	232.2 (1.0)	233.9 (1.1)	233.7 (1.7)
75	243.0 (1.1)	242.3 (1.6)	245.7 (1.6)	252.4 (0.8)	254.2 (1.1)	256.2 (1.0)	257.4 (1.5)
90	263.8 (1.2)	262.2 (1.2)	265.1 (1.9)	271.6 (1.8)	272.5 (1.2)	274.1 (1.1)	276.8 (1.9)
95	275.2 (1.1)	273.6 (1.9)	276.4 (2.1)	282.8 (1.7)	283.8 (1.4)	284.6 (1.6)	287.9 (1.7)
FEMALE STUDENTS							
Mean	219.9 (1.0)	220.8 (1.2)	221.7 (1.2)	230.2 (1.1)	228.4 (1.0)	230.0 (0.9)	229.0 (0.7)
Standard Deviation	35.3 (0.4)	33.7 (0.5)	33.7 (0.6)	32.4 (0.6)	32.7 (0.7)	32.9 (0.7)	32.9 (0.5)
Percentiles							
5	159.4 (1.3)	162.8 (1.7)	163.5 (2.3)	174.5 (2.8)	171.8 (1.6)	173.5 (1.5)	173.5 (1.4)
10	173.1 (2.0)	176.6 (1.6)	177.5 (2.6)	187.0 (2.7)	184.9 (1.6)	187.0 (1.3)	185.5 (1.6)
25	196.4 (1.2)	198.9 (1.8)	199.2 (1.8)	208.9 (1.3)	206.9 (1.5)	208.6 (1.0)	206.7 (0.9)
50	221.5 (1.0)	222.2 (1.1)	223.5 (1.1)	231.8 (1.0)	229.9 (1.0)	231.5 (1.0)	230.0 (1.4)
75	244.3 (1.5)	244.2 (1.4)	245.5 (1.5)	252.7 (1.0)	251.1 (1.1)	253.5 (1.3)	251.7 (1.6)
90	264.2 (1.4)	263.1 (1.0)	263.3 (1.6)	270.4 (1.3)	269.2 (1.2)	270.8 (1.7)	270.7 (1.3)
95	276.1 (1.8)	273.9 (1.7)	274.2 (2.0)	281.4 (1.1)	279.8 (2.3)	281.0 (1.8)	281.9 (1.8)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.16
(continued)

NAEP 1996 Long-Term Trend Mathematics Results — Age 9

Scale Score Means, Standard Deviations, and Percentiles

	1978	1982	1986	1990	1992	1994	1996
WHITE STUDENTS							
Mean	224.1 (0.9)	224.0 (1.1)	226.9 (1.1)	235.2 (0.8)	235.1 (0.8)	236.8 (1.0)	236.9 (1.0)
Standard Deviation	34.0 (0.3)	32.8 (0.4)	32.6 (0.5)	31.2 (0.5)	31.0 (0.5)	31.4 (0.4)	32.4 (0.6)
Percentiles							
5	166.3 (1.5)	168.1 (1.4)	170.6 (2.4)	181.8 (2.4)	181.8 (1.5)	182.4 (2.4)	182.5 (1.4)
10	179.4 (1.5)	180.8 (1.7)	183.9 (1.7)	194.0 (1.6)	194.2 (1.5)	194.7 (1.1)	194.8 (1.8)
25	201.4 (1.1)	201.9 (1.3)	205.3 (1.1)	214.6 (0.9)	215.0 (0.9)	216.5 (1.3)	215.0 (1.4)
50	225.1 (1.0)	225.3 (1.4)	228.3 (1.1)	236.3 (1.0)	236.1 (1.1)	238.3 (1.1)	237.8 (1.2)
75	247.7 (0.8)	246.8 (0.9)	249.6 (0.8)	256.4 (0.6)	256.4 (1.0)	258.9 (1.1)	259.7 (0.8)
90	267.0 (1.1)	265.3 (1.0)	267.4 (1.2)	274.5 (0.8)	273.9 (1.3)	275.3 (1.1)	278.2 (1.0)
95	278.4 (1.7)	276.0 (1.3)	278.2 (1.8)	284.8 (2.1)	284.5 (1.6)	285.7 (1.2)	288.8 (1.6)
BLACK STUDENTS							
Mean	192.4 (1.1)	194.9 (1.6)	201.6 (1.6)	208.4 (2.2)	208.0 (2.0)	212.1 (1.6)	211.6 (1.4)
Standard Deviation	34.5 (0.8)	33.7 (0.8)	31.7 (1.1)	31.5 (0.8)	31.8 (0.7)	30.8 (1.1)	31.1 (0.9)
Percentiles							
5	133.7 (1.9)	136.7 (2.5)	146.2 (3.2)	156.0 (1.7)	154.9 (3.4)	159.8 (3.8)	158.1 (6.3)
10	147.0 (1.7)	150.4 (2.3)	158.4 (4.9)	167.1 (3.7)	165.9 (2.9)	171.1 (3.0)	170.7 (3.1)
25	169.3 (1.9)	172.5 (2.0)	180.5 (4.1)	186.0 (4.1)	185.5 (2.4)	191.3 (1.7)	190.2 [illegible]
50	193.0 (1.1)	196.6 (2.0)	202.9 (1.6)	208.4 (3.1)	208.6 (2.1)	213.3 (1.7)	21[illegible].3 [illegible]
75	216.4 (1.6)	218.2 (2.0)	223.6 (2.0)	231.4 (2.1)	230.4 (2.0)	233.7 (1.0)	233.5 [illegible]
90	236.1 (1.6)	236.7 (2.5)	241.2 (1.7)	248.9 (2.9)	249.2 (2.1)	251.6 (5.2)	250.1 (1.3)
95	247.5 (1.4)	247.9 (2.8)	251.3 (1.3)	258.9 (4.3)	258.7 (3.4)	261.6 (2.2)	259.9 (2.7)
HISPANIC STUDENTS							
Mean	202.9 (2.2)	204.0 (1.3)	205.4 (2.1)	213.8 (2.1)	211.9 (2.3)	209.9 (2.3)	214.7 (1.7)
Standard Deviation	35.1 (1.4)	32.8 (1.1)	31.1 (1.9)	30.3 (1.2)	31.9 (1.4)	30.7 (1.3)	31.6 (1.2)
Percentiles							
5	144.4 (5.4)	148.1 (2.8)	154.8 (3.7)	161.8 (3.4)	158.6 (4.4)	159.1 (3.3)	163.5 (8.7)
10	156.3 (3.7)	160.8 (3.2)	163.8 (1.8)	173.4 (1.4)	169.0 (3.5)	170.3 (4.1)	173.3 (4.1)
25	178.7 (3.2)	181.3 (2.3)	184.6 (3.2)	193.1 (3.6)	189.7 (2.2)	189.8 (3.0)	191.6 (2.3)
50	204.3 (3.0)	205.2 (1.6)	206.3 (2.4)	216.2 (4.1)	211.8 (3.5)	210.5 (2.5)	215.2 (1.7)
75	227.2 (2.5)	226.5 (2.0)	226.0 (3.8)	235.1 (3.3)	233.8 (3.4)	230.3 (3.8)	237.3 (2.4)
90	249.5 (4.0)	246.4 (3.4)	244.8 (3.8)	251.7 (3.4)	252.7 (3.8)	249.4 (4.4)	256.0 (4.2)
95	259.6 (4.6)	256.6 (2.9)	254.4 (4.6)	262.2 (3.5)	263.1 (6.8)	259.4 (7.3)	265.8 (4.6)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.17

NAEP 1996 Long-Term Trend Mathematics Results — Age 13

Scale Score Means, Standard Deviations, and Percentiles

	1978	1982	1986	1990	1992	1994	1996
TOTAL SAMPLE							
Mean	264.1 (1.1)	268.6 (1.1)	269.0 (1.2)	270.4 (0.9)	273.1 (0.9)	274.3 (1.0)	274.3 (0.8)
Standard Deviation	39.0 (0.5)	33.4 (0.5)	30.8 (0.5)	31.1 (0.5)	30.9 (0.6)	32.4 (0.5)	31.6 (0.6)
Percentiles							
5	198.2 (1.6)	212.4 (2.7)	218.3 (1.8)	217.6 (2.2)	220.5 (2.0)	219.7 (2.0)	221.3 (1.0)
10	213.3 (1.5)	225.3 (1.6)	230.0 (1.4)	230.2 (1.4)	233.2 (1.2)	232.5 (1.4)	233.3 (0.9)
25	238.1 (1.3)	246.2 (1.2)	248.3 (1.8)	249.8 (0.9)	252.9 (1.1)	253.3 (1.3)	253.8 (0.8)
50	265.2 (1.1)	269.5 (1.0)	268.7 (1.3)	270.9 (1.0)	274.1 (0.7)	275.6 (0.9)	275.2 (0.7)
75	291.1 (1.1)	291.6 (1.1)	289.6 (1.3)	291.7 (1.0)	294.0 (1.0)	296.5 (1.2)	295.6 (1.5)
90	313.4 (1.2)	310.8 (1.2)	309.2 (1.5)	309.9 (1.0)	311.9 (1.6)	314.6 (1.2)	313.8 (1.9)
95	326.6 (1.3)	322.2 (1.2)	320.5 (2.2)	320.1 (1.6)	322.9 (1.2)	326.1 (1.5)	324.9 (1.3)
MALE STUDENTS							
Mean	263.6 (1.3)	269.2 (1.4)	270.0 (1.1)	271.2 (1.2)	274.1 (1.1)	276.0 (1.3)	276.3 (0.9)
Standard Deviation	40.1 (0.5)	34.4 (0.7)	31.6 (0.7)	32.4 (0.7)	31.6 (0.9)	33.5 (0.8)	32.1 (0.8)
Percentiles							
5	195.8 (1.4)	211.5 (2.2)	218.0 (1.8)	215.5 (2.1)	220.5 (2.9)	218.9 (2.9)	222.2 (1.5)
10	211.4 (1.4)	224.3 (2.0)	229.5 (1.7)	228.6 (2.0)	233.2 (2.0)	232.6 (2.6)	234.0 (1.5)
25	236.7 (1.4)	246.1 (1.5)	248.9 (2.3)	250.2 (1.7)	253.1 (1.8)	254.8 (1.7)	255.5 (1.4)
50	264.8 (1.4)	270.2 (1.2)	270.1 (1.6)	272.0 (1.0)	274.9 (1.0)	278.0 (1.3)	277.5 (1.0)
75	291.5 (1.5)	293.3 (1.2)	291.4 (1.6)	293.1 (1.2)	295.7 (0.8)	298.9 (1.5)	298.0 (1.7)
90	314.4 (1.7)	312.5 (1.5)	310.8 (1.5)	312.4 (1.4)	314.0 (1.6)	317.2 (2.2)	316.9 (2.0)
95	327.5 (1.5)	324.1 (1.3)	322.0 (2.6)	323.1 (1.9)	324.8 (2.1)	328.7 (2.2)	327.4 (1.5)
FEMALE STUDENTS							
Mean	264.7 (1.1)	268.0 (1.1)	267.9 (1.5)	269.6 (0.9)	272.0 (1.0)	272.7 (1.0)	272.4 (1.0)
Standard Deviation	37.9 (0.6)	32.3 (0.5)	30.0 (0.7)	29.7 (0.5)	30.3 (0.6)	31.1 (0.5)	31.0 (0.7)
Percentiles							
5	200.9 (2.6)	213.5 (1.5)	218.5 (3.2)	220.4 (2.3)	220.6 (1.0)	220.4 (1.9)	220.7 (1.7)
10	215.0 (1.6)	226.2 (1.4)	230.6 (2.0)	231.4 (1.2)	233.0 (1.3)	232.5 (1.5)	232.7 (1.2)
25	239.4 (1.4)	246.3 (1.1)	247.8 (1.6)	249.5 (1.1)	252.7 (1.2)	252.3 (0.8)	252.3 (0.9)
50	265.7 (1.2)	268.8 (0.9)	267.4 (1.7)	269.9 (1.2)	273.4 (1.0)	273.5 (0.9)	273.0 (1.1)
75	290.7 (1.0)	290.1 (1.1)	287.8 (1.7)	290.3 (1.3)	292.2 (1.3)	293.9 (1.6)	293.1 (1.7)
90	312.4 (1.4)	308.8 (1.5)	307.2 (2.8)	307.7 (1.5)	309.8 (1.2)	311.4 (1.7)	311.1 (2.0)
95	325.6 (1.2)	320.1 (2.0)	318.5 (2.4)	317.3 (0.8)	320.8 (1.1)	323.1 (2.9)	322.5 (3.0)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.17
(continued)

NAEP 1996 Long-Term Trend Mathematics Results — Age 13

Scale Score Means, Standard Deviations, and Percentiles

	1978	1982	1986	1990	1992	1994	1996
WHITE STUDENTS							
Mean	271.6 (0.8)	274.4 (1.0)	273.6 (1.3)	276.3 (1.1)	278.9 (0.9)	280.8 (0.9)	281.2 (0.9)
Standard Deviation	35.7 (0.5)	31.0 (0.4)	29.4 (0.6)	29.0 (0.5)	28.5 (0.5)	29.8 (0.6)	28.7 (0.6)
Percentiles							
5	211.9 (1.4)	223.0 (1.6)	225.7 (1.5)	228.2 (1.5)	230.9 (1.6)	230.7 (1.0)	233.1 (1.6)
10	225.5 (1.4)	234.4 (1.2)	236.5 (1.3)	239.3 (1.0)	242.2 (1.4)	242.8 (1.1)	244.5 (1.3)
25	247.6 (0.9)	253.5 (1.1)	254.1 (1.4)	257.3 (1.1)	260.5 (0.8)	262.0 (1.1)	262.2 (1.1)
50	272.2 (1.0)	274.9 (0.9)	273.3 (1.0)	276.6 (1.0)	279.4 (1.0)	281.9 (1.2)	281.3 (1.0)
75	296.0 (0.7)	295.5 (1.0)	293.2 (1.3)	296.0 (1.1)	298.0 (1.1)	300.5 (1.3)	300.3 (0.9)
90	317.1 (1.2)	313.8 (1.4)	312.1 (2.2)	313.2 (1.3)	315.1 (1.3)	317.7 (1.5)	317.7 (1.5)
95	329.6 (1.3)	324.8 (1.4)	322.9 (1.8)	322.9 (1.6)	325.2 (1.4)	328.6 (1.7)	328.0 (1.8)
BLACK STUDENTS							
Mean	229.6 (1.9)	240.4 (1.6)	249.2 (2.3)	249.1 (2.3)	250.2 (1.9)	251.5 (3.5)	252.1 (1.3)
Standard Deviation	36.0 (0.6)	31.0 (1.1)	28.3 (1.1)	28.7 (1.2)	30.1 (1.2)	31.5 (2.2)	29.5 (1.1)
Percentiles							
5	170.2 (1.9)	189.0 (4.3)	201.7 (4.5)	201.6 (5.4)	199.5 (4.5)	201.8 (7.7)	203.9 (3.2)
10	184.1 (2.6)	200.2 (3.7)	213.2 (2.3)	211.8 (2.2)	212.3 (5.1)	212.8 (3.8)	214.2 (3.9)
25	205.5 (1.9)	219.3 (1.8)	230.7 (2.2)	229.9 (3.0)	231.1 (3.0)	231.2 (3.6)	232.2 (1.3)
50	229.0 (2.2)	241.0 (1.9)	249.3 (2.3)	249.4 (2.0)	250.6 (1.9)	250.6 (3.8)	252.6 (2.1)
75	254.1 (2.2)	260.9 (1.4)	266.9 (1.5)	267.8 (2.9)	270.9 (1.8)	271.1 (4.8)	271.8 (2.0)
90	276.4 (2.4)	279.7 (2.2)	284.4 (3.7)	285.3 (2.8)	286.5 (2.1)	291.7 (3.5)	289.2 (2.1)
95	288.4 (3.9)	291.1 (1.7)	296.4 (4.3)	296.2 (4.1)	297.4 (3.5)	304.2 (8.3)	299.6 (3.4)
HISPANIC STUDENTS							
Mean	238.0 (2.0)	252.4 (1.7)	254.3 (2.9)	254.6 (1.8)	259.3 (1.8)	256.0 (1.9)	255.7 (1.6)
Standard Deviation	35.2 (1.1)	31.0 (1.0)	29.3 (1.3)	29.9 (1.2)	28.1 (1.0)	28.8 (1.2)	30.6 (1.0)
Percentiles							
5	180.2 (1.8)	202.3 (2.2)	205.9 (3.6)	206.2 (3.7)	212.2 (3.5)	208.8 (2.8)	203.6 (2.5)
10	192.5 (2.2)	213.5 (2.6)	216.2 (3.8)	216.4 (3.1)	224.0 (2.4)	219.4 (3.0)	216.6 (3.5)
25	214.3 (1.8)	230.7 (1.9)	235.5 (2.7)	234.3 (2.2)	240.6 (3.2)	237.5 (2.3)	236.5 (3.3)
50	237.4 (2.0)	251.9 (1.4)	254.3 (3.4)	255.1 (1.9)	259.4 (2.3)	255.8 (1.6)	255.7 (1.2)
75	261.9 (3.2)	273.7 (1.4)	274.2 (2.4)	275.2 (3.5)	278.6 (2.9)	274.3 (2.2)	276.8 (1.8)
90	283.7 (3.4)	292.8 (2.4)	291.7 (3.1)	292.2 (2.9)	294.9 (1.6)	292.7 (2.3)	293.2 (1.9)
95	296.3 (3.1)	304.1 (2.9)	301.2 (1.9)	303.3 (3.3)	304.1 (3.2)	304.3 (9.7)	304.8 (4.5)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.18

NAEP 1996 Long-Term Trend Mathematics Results — Age 17

Scale Score Means, Standard Deviations, and Percentiles

	1978	1982	1986	1990	1992	1994	1996
TOTAL SAMPLE							
Mean	300.4 (1.0)	298.5 (0.9)	302.0 (0.9)	304.6 (0.9)	306.7 (0.9)	306.2 (1.0)	307.2 (1.2)
Standard Deviation	34.9 (0.3)	32.4 (0.4)	31.0 (0.5)	31.1 (0.6)	30.1 (0.5)	30.2 (0.6)	30.2 (0.5)
Percentiles							
5	241.3 (1.3)	244.9 (1.1)	251.7 (1.2)	253.4 (1.0)	255.6 (2.1)	255.9 (1.9)	256.0 (1.8)
10	254.2 (1.1)	255.9 (1.0)	262.7 (1.0)	264.0 (1.1)	267.2 (1.6)	267.0 (1.0)	267.1 (1.5)
25	276.4 (1.2)	275.8 (1.3)	280.7 (0.6)	282.5 (1.0)	286.3 (1.2)	285.6 (1.0)	286.4 (1.2)
50	301.4 (1.1)	298.8 (1.0)	301.4 (1.3)	304.9 (1.1)	307.6 (1.0)	306.4 (1.2)	308.3 (1.7)
75	325.4 (1.0)	321.5 (0.8)	323.1 (1.9)	326.5 (1.2)	328.0 (1.0)	327.0 (1.2)	328.7 (1.5)
90	344.7 (0.8)	340.6 (0.9)	343.0 (1.3)	344.5 (1.3)	345.2 (1.1)	345.5 (1.5)	345.6 (1.5)
95	355.7 (0.9)	351.2 (1.1)	354.0 (1.1)	355.5 (2.2)	354.8 (1.0)	355.5 (1.7)	354.7 (1.6)
MALE STUDENTS							
Mean	303.8 (1.0)	301.5 (1.0)	304.7 (1.2)	306.3 (1.1)	308.9 (1.1)	308.5 (1.4)	309.5 (1.3)
Standard Deviation	35.4 (0.4)	32.8 (0.5)	32.0 (0.7)	32.3 (0.7)	30.8 (0.6)	30.9 (0.6)	31.1 (0.8)
Percentiles							
5	243.8 (1.2)	247.0 (1.3)	252.7 (3.0)	252.8 (3.0)	257.8 (1.7)	258.0 (1.8)	257.6 (3.9)
10	257.0 (1.2)	257.9 (1.2)	264.1 (1.2)	263.9 (1.2)	268.9 (1.8)	268.4 (2.9)	268.8 (2.4)
25	278.9 (1.2)	278.1 (1.1)	282.3 (1.8)	283.7 (1.3)	287.8 (1.2)	286.8 (2.2)	287.9 (2.2)
50	304.8 (1.3)	301.8 (1.6)	303.9 (1.2)	306.4 (1.6)	309.0 (1.6)	308.3 (1.9)	310.6 (1.2)
75	329.5 (1.1)	325.1 (1.2)	327.8 (2.1)	329.3 (1.1)	331.4 (1.1)	330.7 (1.8)	331.6 (2.0)
90	349.2 (1.0)	344.4 (1.1)	346.7 (1.6)	347.8 (1.4)	348.6 (1.3)	348.9 (1.7)	349.2 (2.1)
95	360.1 (1.0)	354.4 (1.8)	357.5 (1.7)	358.5 (1.3)	358.1 (1.4)	358.8 (1.6)	359.3 (3.2)
FEMALE STUDENTS							
Mean	297.1 (1.0)	295.6 (1.0)	299.4 (1.0)	302.9 (1.1)	304.5 (1.1)	304.1 (1.1)	304.9 (1.4)
Standard Deviation	34.0 (0.4)	31.7 (0.4)	29.9 (0.7)	29.9 (0.9)	29.3 (0.7)	29.1 (0.7)	29.2 (0.5)
Percentiles							
5	239.3 (1.3)	242.8 (1.6)	250.3 (2.8)	253.9 (1.9)	253.7 (2.3)	254.0 (3.2)	254.7 (2.2)
10	252.2 (1.0)	254.1 (1.2)	261.2 (1.4)	264.0 (1.5)	265.6 (2.4)	266.2 (1.0)	265.6 (1.8)
25	274.3 (1.3)	273.7 (1.2)	279.3 (1.3)	281.5 (1.3)	284.8 (1.1)	285.1 (1.1)	285.2 (1.6)
50	298.3 (1.1)	296.1 (1.2)	299.1 (1.3)	303.7 (1.7)	305.8 (1.5)	304.9 (1.3)	305.9 (1.7)
75	321.5 (1.0)	317.7 (0.8)	319.8 (1.7)	324.1 (1.2)	324.8 (1.2)	323.7 (1.3)	326.0 (1.3)
90	340.3 (1.4)	336.7 (1.7)	338.2 (2.2)	341.4 (1.6)	341.4 (2.1)	341.0 (2.1)	342.2 (1.7)
95	350.4 (1.5)	347.2 (1.5)	349.3 (1.9)	351.8 (2.2)	350.6 (2.3)	351.5 (2.9)	350.5 (1.3)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table B.18
(continued)

NAEP 1996 Long-Term Trend Mathematics Results — Age 17

Scale Score Means, Standard Deviations, and Percentiles

	1978	1982	1986	1990	1992	1994	1996
WHITE STUDENTS							
Mean	305.9 (0.9)	303.7 (0.9)	307.5 (1.0)	309.5 (1.0)	311.9 (0.8)	312.3 (1.1)	313.4 (1.4)
Standard Deviation	32.3 (0.2)	30.4 (0.4)	29.1 (0.6)	29.5 (0.5)	28.4 (0.5)	28.6 (0.6)	28.0 (0.5)
Percentiles							
5	251.9 (0.6)	253.3 (1.1)	261.2 (1.6)	260.2 (1.3)	264.1 (2.0)	264.8 (1.7)	265.8 (1.2)
10	263.3 (1.3)	263.8 (1.1)	270.5 (1.3)	270.5 (1.5)	274.4 (1.4)	275.3 (1.7)	276.4 (1.6)
25	283.5 (1.0)	282.3 (1.1)	286.9 (1.2)	288.8 (1.5)	292.8 (1.1)	293.1 (1.5)	294.3 (1.7)
50	306.6 (1.0)	303.9 (1.2)	306.8 (1.3)	310.1 (1.3)	312.8 (1.0)	312.4 (1.3)	314.6 (1.7)
75	328.9 (0.8)	325.1 (0.9)	327.8 (1.7)	330.1 (1.2)	332.2 (1.0)	332.2 (1.2)	333.1 (1.5)
90	347.3 (0.7)	343.4 (1.1)	346.1 (1.3)	347.2 (1.0)	348.0 (1.0)	349.1 (1.6)	348.9 (1.4)
95	357.8 (0.7)	353.4 (1.5)	356.0 (1.4)	357.1 (1.3)	357.4 (1.2)	358.9 (1.8)	357.7 (1.8)
BLACK STUDENTS							
Mean	268.4 (1.3)	271.8 (1.2)	278.6 (2.1)	288.5 (2.8)	285.8 (2.2)	285.5 (1.8)	286.4 (1.7)
Standard Deviation	31.8 (1.0)	29.2 (0.7)	26.4 (1.4)	27.9 (1.7)	27.5 (1.3)	25.6 (1.0)	27.7 (0.9)
Percentiles							
5	217.2 (2.0)	225.1 (1.4)	236.7 (3.9)	245.4 (4.4)	238.5 (4.3)	241.1 (5.7)	240.9 (6.4)
10	227.8 (1.7)	234.5 (1.7)	244.3 (4.2)	253.5 (3.5)	248.9 (6.9)	251.1 (1.9)	251.3 (2.1)
25	245.7 (1.2)	251.4 (1.6)	259.9 (1.6)	268.7 (1.8)	267.4 (3.8)	268.2 (2.5)	267.9 (2.5)
50	267.7 (1.6)	271.2 (1.4)	278.6 (3.9)	287.1 (2.5)	286.9 (1.9)	285.9 (2.1)	285.9 (1.4)
75	290.5 (2.2)	291.2 (1.7)	296.1 (2.5)	307.1 (5.3)	303.9 (3.9)	303.4 (2.0)	305.6 (2.3)
90	310.3 (2.1)	310.8 (1.7)	312.0 (7.4)	325.7 (5.8)	320.8 (2.3)	317.3 (4.1)	322.5 (3.4)
95	320.7 (2.5)	321.3 (2.2)	324.8 (4.1)	337.7 (4.2)	330.8 (3.0)	326.1 (6.5)	333.2 (4.9)
HISPANIC STUDENTS							
Mean	276.3 (2.3)	276.7 (1.8)	283.1 (2.9)	283.5 (2.9)	292.2 (2.6)	290.8 (3.7)	292.0 (2.1)
Standard Deviation	32.9 (1.0)	29.3 (1.0)	28.7 (2.0)	31.8 (1.8)	26.9 (1.0)	28.4 (1.7)	29.2 (1.4)
Percentiles							
5	224.1 (4.4)	232.0 (1.7)	236.3 (5.3)	229.1 (5.4)	247.5 (4.3)	244.5 (5.1)	243.3 (12.0)
10	234.0 (2.9)	240.7 (3.2)	248.5 (4.5)	242.2 (8.1)	257.8 (3.5)	253.6 (5.8)	253.7 (3.0)
25	253.4 (1.8)	255.8 (2.4)	264.7 (2.8)	263.8 (6.8)	273.3 (4.5)	271.1 (3.8)	272.2 (2.3)
50	275.1 (3.6)	275.3 (3.2)	283.1 (2.5)	281.8 (2.4)	291.6 (3.4)	290.1 (5.4)	292.8 (2.2)
75	298.5 (3.9)	297.1 (2.6)	301.2 (4.2)	304.0 (4.4)	310.7 (3.7)	311.0 (5.5)	312.3 (3.5)
90	319.5 (3.9)	314.9 (2.6)	318.6 (2.3)	325.1 (3.6)	327.7 (4.8)	328.7 (3.6)	330.0 (4.0)
95	332.0 (0.9)	326.7 (4.4)	329.3 (7.3)	336.3 (8.6)	336.4 (2.7)	338.4 (2.9)	340.6 (7.4)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Data Appendix C

Reading

Table C.1

NAEP 1996 Reading Long-Term Trend Assessment — Age 9
Percentages of students with Reading scale scores at or above 150

THE NATION'S REPORT CARD

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	90.6 (0.5)	93.1 (0.4)	94.6 (0.4)	92.3 (0.3)	92.7 (0.7)	90.1 (0.9)	92.3 (0.4)	92.1 (0.7)	92.7 (0.7)	+			–
Gender													
Male	87.9 (0.7)	91.0 (0.5)	92.9 (0.5)	90.4 (0.5)	90.4 (0.9)	87.9 (1.4)	90.2 (0.8)	90.2 (1.0)	90.7 (0.8)	+			
Female	93.2 (0.5)	95.3 (0.3)	96.4 (0.4)	94.2 (0.4)	94.9 (1.0)	92.4 (1.1)	94.4 (0.6)	94.0 (0.8)	94.6 (0.8)				
Race/Ethnicity													
White	94.0 (0.4)	96.0 (0.3)	97.1 (0.2)	95.4 (0.3)	95.1 (0.7)	93.5 (0.9)	95.8 (0.5)	95.7 (0.5)	95.9 (0.8)				
Black	69.7 (1.7)	80.7 (1.1)	84.9 (1.4)	81.3 (1.0)	83.2 (2.4)	76.9 (2.7)	79.6 (2.2)	78.7 (2.4)	83.1 (1.9)	+		+	–
Hispanic	*****(****)	80.8 (2.5)	84.5 (1.8)	82.0 (2.1)	85.6 (3.5)	83.7 (1.8)	83.4 (2.6)	80.4 (4.6)	84.2 (2.6)				
Other	86.0 (1.9)	92.4 (1.9)	96.1 (1.2)	95.4 (1.1)	96.9 (1.8)	89.3 (3.1)	90.8 (2.9)	91.0 (3.4)	94.7 (2.0)	+			–
Grade													
Below Modal Grade	75.6 (1.3)	81.2 (1.1)	84.4 (1.0)	82.1 (0.7)	85.0 (1.9)	82.2 (1.9)	85.4 (0.9)	85.7 (1.6)	86.0 (1.3)	+		+	
At Modal Grade	95.4 (0.4)	96.8 (0.3)	98.6 (0.2)	97.4 (0.2)	97.1 (0.7)	95.8 (0.6)	97.4 (0.4)	96.3 (0.7)	96.0 (0.7)				–
Above Modal Grade	98.0 (1.3)	98.8(****)	97.5 (1.6)	100.0(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	93.4 (0.9)	94.1 (0.5)	96.4 (0.7)	94.2 (0.6)	92.8 (1.3)	92.6 (1.6)	94.8 (0.9)	95.0 (2.0)	95.3 (1.1)				
Southeast	82.7 (1.9)	89.8 (0.8)	93.0 (0.9)	89.7 (0.8)	91.3 (1.7)	84.5 (2.4)	87.1 (1.1)	90.3 (1.8)	89.7 (2.1)				
Central	93.6 (0.5)	95.6 (0.5)	95.8 (0.7)	94.3 (0.6)	95.4 (0.7)	92.7 (1.4)	95.1 (0.9)	94.2 (1.3)	94.0 (1.4)				
West	91.0 (1.1)	92.4 (1.0)	93.6 (0.8)	90.9 (0.9)	91.5 (1.6)	90.6 (1.3)	91.8 (1.3)	89.4 (1.8)	92.0 (1.3)				
Parents' Education Level													
Less Than H.S.	82.3 (1.4)	84.4 (1.2)	85.6 (1.5)	86.2 (1.3)	84.4 (4.4)	83.0 (3.8)	86.4 (5.4)	82.3 (3.8)	88.6 (4.5)				
Graduated H.S.	92.1 (0.7)	94.2 (0.5)	94.9 (0.6)	92.8 (0.7)	92.3 (2.1)	91.2 (1.3)	91.4 (1.6)	91.9 (1.4)	89.4 (1.8)			–	
Post H.S.	96.1 (0.4)	96.5 (0.4)	97.3 (0.4)	95.4 (0.4)	95.1 (0.8)	92.6 (1.2)	94.8 (0.5)	95.3 (0.7)	95.0 (0.7)			–	
Unknown	86.7 (0.7)	91.5 (0.5)	92.7 (0.9)	91.0 (0.4)	90.9 (1.2)	87.6 (1.4)	91.3 (0.8)	89.2 (1.5)	91.7 (1.6)	+			
Type of School													
Public	*****(****)	*****(****)	94.2(0.4)	91.7(0.4)	92.1(0.8)	89.6(1.0)	91.5(0.5)	91.4(0.8)	91.9(0.7)	–		–	+
Non–Public	*****(****)	*****(****)	98.1(0.4)	96.8(0.5)	96.7(1.3)	96.2(1.7)	97.9(1.2)	97.7(1.3)	97.7(1.5)				
Quartiles													
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	99.6 (0.1)	100.0(0.0)	99.9(****)	99.9 (0.1)	99.7 (0.2)	99.1 (0.5)	99.6 (0.1)	99.6(****)	99.5 (0.2)				
Lower	63.1 (1.1)	72.6 (1.0)	78.7 (1.2)	69.7 (0.9)	71.3 (2.3)	62.2 (3.0)	69.9 (1.4)	69.1 (2.6)	71.8 (2.7)	+			–

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.2

NAEP 1996 Reading Long-Term Trend Assessment — Age 9
Percentages of students with Reading scale scores at or above 200

THE NATION'S REPORT CARD naep

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	58.7 (1.0)	62.1 (0.8)	67.7 (1.0)	61.5 (0.7)	62.6 (1.3)	58.9 (1.3)	62.0 (1.1)	63.3 (1.4)	63.7 (1.2)	+			
Gender													
Male	52.7 (1.2)	56.2 (1.0)	62.7 (1.1)	58.0 (0.9)	58.4 (1.8)	53.8 (1.9)	56.9 (1.6)	59.2 (1.5)	57.8 (2.0)				−
Female	64.6 (1.1)	68.1 (0.8)	72.7 (1.0)	65.2 (0.8)	66.9 (1.4)	64.2 (1.2)	67.3 (1.2)	67.3 (1.9)	69.5 (1.5)	+			
Race/Ethnicity													
White	65.0 (1.0)	69.0 (0.8)	74.2 (0.7)	68.6 (0.8)	68.4 (1.6)	66.0 (1.4)	69.3 (1.2)	70.1 (1.5)	70.9 (1.5)	+			
Black	22.0 (1.5)	31.6 (1.5)	41.3 (1.9)	36.6 (1.5)	39.4 (2.9)	33.9 (3.4)	36.6 (2.2)	38.3 (2.8)	41.3 (3.2)	+		+	−
Hispanic	*****(****)	34.6 (3.0)	41.6 (2.6)	39.6 (2.2)	45.9 (3.3)	40.9 (2.7)	43.1 (3.5)	37.1 (4.6)	47.5 (3.8)	+			
Other	42.0 (5.2)	58.8 (5.3)	72.9 (3.7)	72.7 (2.9)	77.1 (4.8)	56.8 (4.5)	59.7 (4.9)	65.4 (4.8)	65.4 (4.3)	+			−
Grade													
Below Modal Grade	28.8 (1.4)	33.8 (1.2)	40.4 (1.5)	38.0 (1.0)	43.4 (2.1)	40.1 (1.8)	43.5 (1.8)	47.1 (2.5)	45.5 (3.0)	+		+	
At Modal Grade	68.1 (1.1)	70.7 (0.7)	78.3 (0.8)	73.5 (0.7)	73.7 (1.5)	72.5 (1.6)	76.0 (0.9)	73.9 (1.4)	72.7 (1.5)	+		+	−
Above Modal Grade	81.0 (4.8)	79.8 (4.7)	88.5 (5.4)	93.4 (3.8)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	64.1 (1.6)	66.8 (1.5)	73.5 (2.1)	66.5 (1.5)	65.7 (2.5)	65.4 (2.8)	69.3 (2.8)	70.1 (3.6)	70.5 (2.0)				
Southeast	45.9 (2.8)	53.1 (1.2)	62.6 (2.4)	54.8 (1.6)	58.0 (2.6)	48.2 (3.3)	50.6 (1.9)	60.8 (2.8)	56.9 (2.8)	+			
Central	65.7 (1.4)	67.4 (1.3)	69.4 (1.2)	66.0 (1.6)	68.4 (1.7)	62.6 (2.0)	67.7 (1.9)	65.5 (2.0)	66.1 (3.4)				
West	55.6 (1.8)	59.5 (2.1)	65.9 (1.5)	58.9 (1.5)	59.5 (3.5)	59.6 (2.9)	60.4 (3.0)	57.8 (3.3)	61.7 (2.4)				
Parents' Education Level													
Less Than H.S.	39.4 (1.7)	41.8 (1.4)	47.5 (1.6)	47.4 (2.1)	44.0 (7.1)	42.8 (4.1)	46.4 (4.5)	43.3 (6.3)	48.3 (4.7)				
Graduated H.S.	59.6 (1.3)	64.1 (1.0)	66.5 (1.3)	60.0 (1.3)	62.7 (3.4)	59.4 (2.9)	60.4 (2.4)	59.4 (3.3)	58.7 (2.6)				
Post H.S.	73.7 (1.1)	73.3 (1.0)	77.8 (1.1)	71.9 (0.9)	69.7 (1.3)	65.9 (2.0)	70.7 (1.5)	72.5 (1.5)	70.3 (1.5)			−	
Unknown	49.3 (1.2)	55.1 (1.0)	59.0 (1.1)	55.9 (1.0)	56.1 (1.9)	52.7 (1.9)	55.2 (1.9)	55.3 (1.6)	59.2 (1.8)	+		+	
Type of School													
Public	*****(****)	*****(****)	66.2(1.0)	60.0(0.8)	61.1(1.5)	57.5(1.5)	60.0(1.1)	61.6(1.6)	61.2(1.4)	−		−	+
Non-Public	*****(****)	*****(****)	79.3(1.8)	73.9(1.7)	73.5(2.5)	74.8(3.0)	77.1(2.5)	77.1(3.4)	79.5(3.5)				
Quartiles													
Upper	98.7 (0.3)	99.2 (0.2)	99.6 (0.2)	99.8 (0.1)	99.7(****)	99.7(****)	99.9(****)	99.8 (0.1)	99.8(****)				
Middle two	66.4 (1.0)	72.8 (0.5)	80.6 (0.6)	70.2 (0.6)	72.4 (1.1)	65.8 (1.3)	71.4 (1.4)	73.5 (1.6)	74.0 (1.4)	+			−
Lower	3.0 (0.5)	3.8 (0.4)	9.9 (0.9)	5.0 (0.4)	6.0 (1.2)	4.3 (1.1)	5.4 (0.9)	6.3 (1.7)	7.0 (1.4)	+			

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.3

NAEP 1996 Reading Long-Term Trend Assessment — Age 9
Percentages of students with Reading scale scores at or above 250

THE NATION'S REPORT CARD

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	15.6 (0.6)	14.6 (0.6)	17.7 (0.8)	17.2 (0.6)	17.5 (1.1)	18.4 (1.0)	16.2 (0.8)	16.5 (1.2)	17.7 (0.8)	+		+	
Gender													
Male	12.0 (0.6)	11.5 (0.6)	14.6 (0.9)	15.9 (0.7)	15.8 (1.4)	16.1 (1.2)	14.2 (1.0)	15.2 (1.2)	15.0 (1.3)			+	-
Female	19.2 (0.8)	17.7 (0.8)	20.7 (1.0)	18.4 (0.7)	19.1 (1.2)	20.8 (1.2)	18.2 (1.1)	17.8 (1.5)	20.4 (1.4)				
Race/Ethnicity													
White	18.0 (0.7)	17.4 (0.7)	21.0 (0.9)	20.9 (0.7)	20.3 (1.5)	22.6 (1.2)	19.6 (1.0)	19.7 (1.5)	21.6 (1.1)	+		+	
Black	1.6 (0.5)	2.0 (0.3)	4.1 (0.6)	4.5 (0.5)	5.6 (1.2)	5.2 (1.5)	4.6 (0.8)	4.4 (1.5)	6.6 (1.3)	+		+	
Hispanic	*****(****)	2.6 (0.5)	5.0 (1.4)	4.3 (0.6)	8.6 (2.3)	5.8 (2.0)	7.2 (2.3)	6.4 (1.6)	7.5 (3.0)				
Other	8.7 (2.1)	14.5 (3.5)	18.7 (4.3)	24.7 (2.6)	29.8 (6.9)	13.1 (3.9)	12.9 (2.6)	15.8 (3.7)	17.5 (3.5)				-
Grade													
Below Modal Grade	2.7 (0.3)	2.7 (0.4)	4.1 (0.5)	5.2 (0.5)	7.4 (0.8)	7.1 (0.9)	6.6 (0.7)	7.0 (1.3)	9.2 (1.1)	+		+	
At Modal Grade	19.6 (0.7)	18.2 (0.7)	22.9 (0.9)	23.2 (0.8)	23.0 (1.8)	26.5 (1.4)	23.3 (1.2)	22.5 (1.4)	21.9 (0.9)			+	-
Above Modal Grade	34.2 (5.4)	22.3 (6.7)	46.7(10.3)	53.2 (8.7)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	17.9 (0.9)	17.7 (1.0)	21.6 (2.2)	19.8 (1.3)	20.8 (1.9)	23.9 (1.9)	20.2 (2.1)	18.9 (2.1)	22.4 (2.0)				
Southeast	10.2 (1.1)	9.9 (0.8)	15.3 (1.5)	13.8 (0.9)	14.7 (1.4)	12.8 (2.7)	11.7 (1.6)	15.8 (2.8)	14.2 (1.9)				
Central	19.7 (0.9)	17.2 (1.2)	17.9 (1.1)	19.2 (1.3)	20.7 (3.2)	19.3 (2.0)	17.6 (1.3)	18.3 (2.4)	18.6 (2.8)				
West	13.0 (1.4)	12.7 (1.2)	16.4 (1.5)	15.9 (1.0)	14.5 (1.1)	18.1 (2.1)	15.6 (1.9)	13.5 (1.7)	16.0 (1.2)				
Parents' Education Level													
Less Than H.S.	6.1 (0.8)	5.2 (0.7)	6.7 (1.0)	6.6 (0.7)	6.3 (2.1)	9.1 (2.2)	7.8 (2.6)	2.8 (1.8)	8.0 (3.2)				
Graduated H.S.	13.7 (0.8)	14.0 (0.9)	15.0 (1.1)	14.3 (0.9)	16.8 (2.0)	17.2 (1.4)	13.0 (2.0)	13.4 (2.0)	14.6 (2.0)				
Post H.S.	26.1 (1.1)	22.3 (0.9)	25.9 (1.1)	26.3 (0.8)	22.8 (1.6)	24.3 (1.7)	22.2 (1.3)	23.3 (1.8)	22.5 (1.4)				
Unknown	9.6 (0.5)	9.7 (0.6)	11.0 (0.8)	11.8 (0.6)	12.3 (1.3)	13.2 (1.5)	11.4 (1.0)	10.5 (1.4)	14.2 (1.2)	+		+	
Type of School													
Public	*****(****)	*****(****)	16.7(0.9)	16.3(0.6)	16.6(0.9)	17.2(1.0)	15.3(0.9)	15.7(1.3)	16.5(0.9)				
Non-Public	*****(****)	*****(****)	25.6(1.7)	23.6(1.7)	23.6(3.5)	32.4(4.3)	22.6(2.2)	23.6(2.8)	25.0(4.2)				
Quartiles													
Upper	52.6 (0.9)	50.5 (1.6)	58.1 (1.7)	61.0 (1.0)	63.1 (3.2)	66.0 (1.9)	59.4 (2.2)	59.6 (3.0)	63.0 (1.8)	+		+	-
Middle two	5.0 (0.3)	3.9 (0.3)	6.3 (0.4)	3.6 (0.3)	3.3 (0.6)	3.8 (0.5)	2.7 (0.4)	3.2 (0.6)	3.9 (0.7)			-	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1 (****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.4

NAEP 1996 Reading Long-Term Trend Assessment — Age 9

Percentages of students with Reading scale scores at or above 300

THE NATION'S REPORT CARD

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	0.9 (0.1)	0.6 (0.1)	0.6 (0.1)	1.0 (0.1)	1.4 (0.3)	1.7 (0.3)	0.7 (0.2)	0.7 (0.3)	1.0 (0.3)				
Gender													
Male	0.6 (0.2)	0.3 (0.1)	0.4 (0.1)	0.8 (0.2)	1.1 (0.4)	1.4 (0.3)	0.5 (0.2)	0.7 (0.4)	0.5 (0.3)				
Female	1.3 (0.2)	0.9 (0.2)	0.8 (0.1)	1.1 (0.1)	1.6 (0.4)	2.0 (0.5)	0.8 (0.3)	0.6 (0.3)	1.5 (0.4)				
Race/Ethnicity													
White	1.1 (0.2)	0.7 (0.1)	0.8 (0.1)	1.2 (0.2)	1.6 (0.3)	2.2 (0.4)	0.9 (0.2)	0.8 (0.3)	1.3 (0.3)				
Black	0.0(****)	0.0(****)	0.0(****)	0.1 (0.1)	0.2(****)	0.3(****)	0.0(****)	0.1(****)	0.1 (****)				
Hispanic	*****(****)	0.0(****)	0.0(****)	0.1(****)	0.4(****)	0.2(****)	0.0(****)	0.1(****)	0.1 (****)				
Other	0.5(****)	0.9(****)	0.5(****)	1.9 (0.6)	4.0 (2.7)	0.7(****)	0.2(****)	0.7(****)	0.9 (****)				
Grade													
Below Modal Grade	0.0(****)	0.1(****)	0.1 (0.0)	0.1 (0.0)	0.3 (0.2)	0.3 (0.2)	0.0(****)	0.1(****)	0.2(****)				
At Modal Grade	1.2 (0.2)	0.8 (0.1)	0.8 (0.1)	1.4 (0.2)	1.8 (0.4)	2.7 (0.5)	1.1 (0.3)	0.9 (0.4)	1.4 (0.4)				
Above Modal Grade	1.7(****)	0.7(****)	5.0(****)	8.3 (3.3)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	1.1 (0.3)	0.9 (0.3)	0.8 (0.2)	1.4 (0.3)	1.7 (0.4)	2.7 (0.7)	0.8 (0.4)	1.0 (0.5)	1.6 (0.6)				
Southeast	0.4 (0.2)	0.3 (0.2)	0.6 (0.3)	0.6 (0.2)	0.8 (0.4)	1.0 (0.5)	0.5(****)	0.7(****)	0.8 (0.4)				
Central	1.3 (0.3)	0.7 (0.2)	0.6 (0.2)	1.1 (0.2)	1.9 (1.1)	1.6 (0.5)	0.9 (0.3)	0.7 (0.3)	1.1 (0.5)				
West	0.7 (0.2)	0.4 (0.2)	0.5 (0.2)	0.8 (0.2)	1.1 (0.4)	1.6 (0.4)	0.5 (0.3)	0.4 (0.2)	0.6 (0.3)				
Parents' Education Level													
Less Than H.S.	0.2(****)	0.1(****)	0.1(****)	0.2(****)	0.0(****)	0.5(****)	0.0(****)	0.0(****)	0.2(****)				
Graduated H.S.	0.6 (0.2)	0.5 (0.2)	0.4 (0.1)	0.6 (0.2)	0.9(****)	1.3 (0.7)	0.6 (0.4)	0.6 (0.3)	0.6(****)				
Post H.S.	2.0 (0.3)	1.2 (0.2)	1.1 (0.2)	2.0 (0.3)	2.2 (0.7)	2.7 (0.6)	1.1 (0.3)	1.1 (0.5)	1.7 (0.5)				
Unknown	0.4 (0.1)	0.2 (0.1)	0.3 (0.1)	0.4 (0.1)	0.6 (0.3)	0.8 (0.4)	0.2 (0.1)	0.2(****)	0.4 (0.2)				
Type of School													
Public	*****(****)	*****(****)	0.6(0.1)	0.9(0.1)	1.2(0.3)	1.6(0.3)	0.6(0.2)	0.6(0.3)	0.9(0.3)				
Non–Public	*****(****)	*****(****)	1.1(0.5)	1.4(0.4)	2.4(1.1)	2.6(1.1)	1.0(0.6)	0.8(0.5)	1.9(0.7)				
Quartiles													
Upper	3.7 (0.5)	2.4 (0.3)	2.5 (0.4)	3.9 (0.5)	5.4 (1.3)	6.7 (1.2)	2.7 (0.7)	2.6 (1.0)	4.0 (1.0)				
Middle two	0.0 (0.0)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.5

NAEP 1996 Reading Long-Term Trend Assessment — Age 9
Percentages of students with Reading scale scores at or above 350

	1971	1975	1980	1984	1988	1990	1992	1994	1996	* ‡ L Q
TOTAL	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Gender										
Male	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Female	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	
Race/Ethnicity										
White	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Black	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Hispanic	*****(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Other	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Grade										
Below Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
At Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	
Above Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.5(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	
Region										
Northeast	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	
Southeast	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Central	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
West	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Parents' Education Level										
Less Than H.S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Graduated H.S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Post H.S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	
Unknown	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Type of School										
Public	*****(****)	*****(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Non-Public	*****(****)	*****(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Quartiles										
Upper	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.0(****)	0.0(****)	0.1(****)	
Middle two	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.6

NAEP 1996 Reading Long-Term Trend Assessment — Age 13
Percentages of students with Reading scale scores at or above 150

THE NATION'S REPORT CARD

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	99.8 (0.0)	99.7 (0.1)	99.9 (0.1)	99.8 (0.0)	99.9 (0.1)	99.8 (0.1)	99.5 (0.3)	99.3 (0.2)	99.6 (0.1)			–	–
Gender													
Male	99.6 (0.1)	99.6 (0.1)	99.8 (0.1)	99.7 (0.1)	99.7 (0.2)	99.7 (0.2)	99.2 (0.4)	99.1 (0.3)	99.5 (0.2)				–
Female	99.9 (0.1)	99.9 (0.1)	99.9 (0.0)	99.9 (0.1)	100.0(****)	99.9(****)	99.8(****)	99.6 (0.2)	99.8(****)				
Race/Ethnicity													
White	99.9 (0.0)	99.9 (0.0)	100.0(****)	99.9 (0.0)	99.9(****)	99.9 (0.1)	99.8 (0.1)	99.6 (0.2)	99.8(****)				
Black	98.6 (0.3)	98.4 (0.3)	99.3 (0.3)	99.4 (0.2)	99.8(****)	99.4(****)	98.7(****)	98.6(****)	99.4 (****)				
Hispanic	*****(****)	99.6 (0.3)	99.7(****)	99.5(****)	99.2(****)	99.1 (0.5)	98.1(****)	98.7(****)	98.7(****)				
Other	99.8(****)	99.5 (****)	99.9(****)	99.8 (****)	100.0(****)	100.0(****)	99.8 (****)	99.1(****)	99.2(****)				
Grade													
Below Modal Grade	99.2 (0.2)	99.0 (0.2)	99.6 (0.2)	99.5 (0.1)	99.7 (0.2)	99.5 (0.3)	98.9 (0.6)	98.8 (0.4)	99.3 (0.3)				
At Modal Grade	100.0 (0.0)	100.0 (0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	99.8 (0.1)	99.9 (0.1)				
Above Modal Grade	100.0(****)	100.0(****)	100.0(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	99.9 (0.1)	99.8 (0.1)	99.9 (0.1)	99.9 (0.1)	99.9(****)	99.9(****)	99.4(****)	99.7(****)	99.6(****)				
Southeast	99.4 (0.2)	99.6 (0.1)	99.7 (0.1)	99.8 (0.1)	99.9 (****)	99.6(****)	99.1 (0.6)	99.5(****)	99.5(****)				
Central	99.9(****)	99.8 (0.1)	100.0(****)	99.9 (0.1)	99.9 (****)	99.9(****)	99.9 (****)	99.2 (0.6)	99.8 (****)				
West	99.8(****)	99.6 (0.2)	99.9 (0.1)	99.7 (0.1)	99.8(****)	99.7 (0.2)	99.5 (0.3)	99.1 (0.4)	99.6(****)				
Parents' Education Level													
Less Than H.S.	99.5 (0.2)	99.4 (0.2)	99.7(****)	99.5 (0.2)	99.9 (****)	99.5(****)	99.4 (****)	98.8(****)	99.5(****)				
Graduated H.S.	99.9 (0.0)	99.8 (0.1)	99.9 (0.0)	99.8 (0.1)	99.8(****)	99.9(****)	99.4(****)	99.6(****)	99.7 (0.2)				
Post H.S.	100.0(****)	99.9(****)	100.0(****)	99.9 (0.0)	100.0(****)	99.9(****)	99.8(****)	99.8 (0.1)	99.8(****)				
Unknown	99.2 (0.2)	99.1 (0.3)	99.3 (0.4)	99.5 (0.2)	99.5(****)	99.1 (0.6)	98.2 (1.2)	97.6 (1.3)	98.9(****)				
Type of School													
Public	*****(****)	*****(****)	99.9(0.1)	99.8(0.1)	99.8(0.1)	99.7(0.1)	99.4(0.3)	99.4(0.2)	99.6(0.2)			–	
Non-Public	*****(****)	*****(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	98.7(0.8)	99.9(****)				
Quartiles													
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	99.0 (0.2)	98.8 (0.2)	99.5 (0.2)	99.3 (0.2)	99.4 (0.4)	99.1 (0.4)	98.0 (1.0)	97.4 (0.7)	98.5 (0.6)			–	–

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table C.7

NAEP 1996 Reading Long-Term Trend Assessment — Age 13

Percentages of students with Reading scale scores at or above 200

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	93.0 (0.5)	93.2 (0.4)	94.8 (0.4)	93.9 (0.3)	94.9 (0.6)	93.8 (0.6)	92.7 (0.7)	91.7 (0.6)	92.8 (0.6)				-
Gender													
Male	90.7 (0.7)	90.9 (0.5)	93.4 (0.6)	92.2 (0.4)	92.8 (1.0)	91.4 (0.9)	90.4 (1.1)	88.8 (1.1)	90.1 (1.1)				-
Female	95.2 (0.4)	95.5 (0.4)	96.1 (0.4)	95.8 (0.3)	96.9 (0.6)	96.3 (0.6)	95.0 (0.7)	94.9 (0.6)	95.3 (0.5)				-
Race/Ethnicity													
White	96.2 (0.3)	96.4 (0.2)	97.1 (0.2)	96.2 (0.3)	96.0 (0.6)	96.0 (0.6)	95.9 (0.6)	95.0 (0.7)	95.9 (0.5)				
Black	74.2 (1.7)	76.9 (1.3)	84.1 (1.7)	85.5 (1.0)	91.3 (2.2)	87.7 (2.3)	82.0 (2.7)	80.6 (2.3)	82.7 (2.8)			+	-
Hispanic	*****(****)	81.3 (2.3)	86.8 (2.4)	86.7 (1.5)	87.4 (2.6)	85.8 (2.4)	83.4 (3.5)	82.4 (2.7)	86.1 (2.8)				
Other	92.3 (2.2)	93.3 (2.0)	93.4 (2.6)	95.1 (1.3)	99.0(****)	93.3 (4.2)	94.8 (2.0)	90.8 (4.9)	91.3 (2.8)				
Grade													
Below Modal Grade	81.3 (1.1)	82.1 (0.9)	87.3 (1.2)	87.0 (0.6)	90.0 (1.1)	88.3 (1.3)	85.7 (1.6)	86.2 (1.2)	88.0 (1.1)	+		+	-
At Modal Grade	97.4 (0.3)	97.4 (0.2)	97.7 (0.3)	97.7 (0.2)	97.9 (0.5)	97.4 (0.3)	98.0 (0.3)	96.1 (0.5)	95.8 (0.6)			-	-
Above Modal Grade	98.6(****)	96.2(****)	98.8(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	95.2 (0.8)	94.0 (0.7)	95.6 (0.8)	95.4 (0.3)	95.1 (1.3)	95.1 (1.1)	92.8 (2.0)	95.9 (0.7)	93.3 (1.7)				
Southeast	87.2 (1.4)	89.9 (1.0)	92.0 (0.8)	92.8 (0.6)	95.9 (1.1)	92.8 (2.0)	90.1 (1.9)	90.2 (1.3)	89.7 (1.6)				-
Central	95.4 (0.7)	95.8 (0.4)	97.1 (0.6)	95.5 (0.5)	94.6 (1.2)	95.0 (0.8)	94.7 (1.5)	92.3 (1.7)	97.0 (0.8)				
West	93.4 (0.8)	92.4 (1.0)	94.2 (1.1)	92.6 (0.7)	94.0 (1.2)	92.7 (0.9)	92.9 (0.9)	89.6 (1.6)	92.0 (1.1)				
Parents' Education Level													
Less Than H.S.	86.6 (1.3)	85.7 (1.0)	87.8 (1.1)	88.0 (0.9)	93.3 (2.0)	88.3 (2.6)	87.8 (2.9)	83.2 (2.9)	86.9 (3.4)				
Graduated H.S.	94.9 (0.5)	94.6 (0.4)	95.1 (0.5)	93.9 (0.5)	95.0 (0.8)	93.7 (0.9)	91.1 (1.6)	90.9 (1.2)	92.7 (1.0)			-	
Post H.S.	98.0 (0.2)	97.7 (0.3)	98.2 (0.3)	97.1 (0.2)	96.5 (0.6)	96.6 (0.6)	96.1 (0.5)	95.8 (0.6)	96.1 (0.5)	-		-	
Unknown	82.2 (1.2)	83.3 (1.0)	83.9 (1.5)	84.3 (1.0)	87.5 (2.9)	86.3 (2.9)	81.1 (3.1)	78.3 (3.7)	79.2 (3.1)				-
Type of School													
Public	*****(****)	*****(****)	94.3(0.5)	93.4(0.3)	94.5(0.6)	93.2(0.7)	91.8(0.8)	91.1(0.7)	92.2(0.6)	-		-	
Non–Public	*****(****)	*****(****)	98.5(0.5)	98.3(0.4)	97.8(1.0)	98.6(0.5)	98.4(0.8)	96.8(1.4)	97.3(1.4)				
Quartiles													
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	99.8 (0.1)	100.0(****)	99.8 (0.1)	99.9 (0.1)	99.9(****)	99.9 (0.1)	99.9(****)	99.7 (0.2)	99.9(****)				
Lower	72.3 (1.2)	72.7 (1.0)	79.5 (1.1)	75.2 (0.7)	79.6 (1.9)	75.6 (1.9)	71.0 (2.3)	67.5 (1.7)	71.3 (2.3)				-

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution: standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.8

NAEP 1996 Reading Long-Term Trend Assessment — Age 13
Percentages of students with Reading scale scores at or above 250

THE NATION'S REPORT CARD naep

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	57.8 (1.1)	58.6 (1.0)	60.7 (1.1)	59.0 (0.6)	58.7 (1.3)	58.7 (1.0)	61.6 (1.4)	60.4 (1.2)	61.3 (1.3)	+		+	
Gender													
Male	51.6 (1.2)	51.7 (1.1)	55.9 (1.2)	54.0 (0.8)	52.3 (1.9)	52.4 (1.5)	55.5 (2.0)	53.3 (1.9)	54.8 (1.6)				
Female	64.0 (1.1)	65.5 (1.2)	65.4 (1.1)	64.0 (0.7)	65.0 (1.4)	65.0 (1.5)	67.5 (1.4)	67.9 (1.7)	67.5 (1.5)			+	
Race/Ethnicity													
White	64.2 (0.9)	65.5 (0.9)	67.8 (0.8)	65.3 (0.7)	63.7 (1.5)	64.8 (1.2)	68.5 (1.4)	68.1 (1.3)	70.1 (1.4)	+		+	
Black	21.1 (1.2)	24.8 (1.6)	30.1 (2.0)	34.6 (1.2)	40.2 (2.3)	41.7 (3.5)	38.4 (2.7)	35.6 (3.5)	35.1 (3.7)	+		+	–
Hispanic	*****(****)	32.0 (3.6)	35.4 (2.6)	39.0 (2.1)	38.0 (4.4)	37.2 (2.9)	40.9 (5.1)	33.9 (3.9)	39.8 (3.9)				
Other	51.3 (4.6)	55.8 (4.4)	55.5 (7.5)	63.8 (3.8)	66.9 (6.1)	52.6 (7.9)	68.2 (4.0)	61.9 (5.5)	56.0 (3.8)				
Grade													
Below Modal Grade	27.1 (1.1)	31.2 (1.2)	38.7 (1.7)	38.5 (1.0)	41.0 (1.8)	42.9 (1.7)	44.3 (2.2)	45.8 (2.2)	48.8 (2.1)	+		+	
At Modal Grade	69.4 (1.0)	68.9 (0.9)	69.6 (1.1)	70.1 (0.6)	70.0 (1.5)	68.8 (1.2)	74.3 (1.5)	71.6 (1.0)	69.0 (1.4)				
Above Modal Grade	84.2 (2.8)	79.4 (5.1)	79.0 (6.3)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	64.6 (2.3)	62.1 (2.2)	62.6 (2.1)	63.2 (1.1)	59.2 (2.5)	60.8 (2.6)	65.9 (3.1)	71.2 (2.6)	62.9 (3.3)				
Southeast	46.3 (2.0)	50.8 (1.7)	54.5 (1.9)	57.9 (1.7)	57.7 (3.5)	57.3 (2.4)	55.7 (3.1)	54.6 (2.8)	53.7 (3.5)			+	–
Central	63.3 (2.3)	64.7 (1.8)	67.2 (2.0)	60.8 (1.4)	57.9 (2.3)	59.4 (2.4)	65.5 (2.9)	62.8 (3.9)	70.6 (2.9)				
West	55.7 (1.7)	55.2 (2.1)	58.2 (2.2)	55.3 (0.8)	59.9 (2.8)	57.5 (2.0)	59.5 (2.2)	55.2 (2.4)	59.7 (2.4)				
Parents' Education Level													
Less Than H.S.	37.9 (1.5)	39.2 (1.6)	37.3 (1.5)	39.7 (1.4)	44.9 (3.5)	40.6 (3.5)	38.7 (3.3)	37.9 (3.1)	39.8 (3.7)				
Graduated H.S.	58.7 (1.2)	57.0 (1.1)	55.3 (1.2)	55.6 (0.9)	54.5 (1.9)	52.6 (1.7)	54.5 (2.0)	53.7 (1.7)	54.1 (2.3)			–	
Post H.S.	75.1 (0.9)	74.3 (1.0)	74.9 (0.9)	70.6 (0.8)	67.5 (2.2)	70.4 (1.3)	71.8 (1.7)	71.2 (1.7)	72.5 (1.4)			–	
Unknown	32.1 (1.4)	34.4 (1.3)	31.5 (2.4)	36.1 (1.8)	36.5 (4.3)	35.8 (2.7)	37.2 (2.8)	31.8 (3.2)	33.3 (3.2)				
Type of School													
Public	*****(****)	*****(****)	58.9(1.2)	57.0(0.7)	57.1(1.4)	56.7(1.2)	59.0(1.5)	58.1(1.4)	59.3(1.5)				
Non-Public	*****(****)	*****(****)	74.7(1.9)	74.2(1.9)	71.7(3.5)	72.9(4.7)	78.0(2.2)	78.2(3.3)	76.8(4.2)				
Quartiles													
Upper	98.6 (0.2)	99.6 (0.1)	97.7 (0.2)	99.0 (0.2)	99.0 (0.6)	99.2 (0.3)	99.4 (0.4)	99.5 (0.3)	99.4 (0.4)				
Middle two	64.4 (0.9)	66.6 (0.9)	68.7 (0.5)	65.7 (0.6)	65.7 (1.8)	65.4 (1.3)	70.7 (1.4)	68.8 (1.6)	70.3 (1.6)	+		+	
Lower	3.9 (0.4)	1.4 (0.2)	7.9 (0.7)	4.3 (0.4)	4.5 (1.1)	4.6 (0.9)	5.7 (1.1)	4.3 (0.7)	5.2 (1.2)				

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table C.9

NAEP 1996 Reading Long-Term Trend Assessment — Age 13
Percentages of students with Reading scale scores at or above 300

THE NATION'S REPORT CARD naep

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	9.8 (0.5)	10.2 (0.5)	11.3 (0.5)	11.0 (0.4)	10.9 (0.8)	11.0 (0.6)	15.3 (0.9)	14.1 (0.8)	13.8 (1.0)	+		+	
Gender													
Male	7.3 (0.5)	7.0 (0.4)	9.1 (0.7)	9.0 (0.4)	8.6 (0.9)	7.6 (0.8)	12.8 (1.1)	10.1 (0.7)	10.3 (1.0)	+		+	
Female	12.3 (0.6)	13.5 (0.7)	13.5 (0.6)	13.2 (0.5)	13.2 (0.9)	14.5 (0.9)	17.7 (1.1)	18.4 (1.1)	17.1 (1.3)	+		+	+
Race/Ethnicity													
White	11.3 (0.5)	12.1 (0.5)	13.6 (0.6)	13.1 (0.5)	12.4 (0.9)	13.3 (0.9)	18.1 (1.1)	17.2 (1.0)	17.2 (1.4)	+		+	
Black	0.8 (0.2)	1.5 (0.3)	1.8 (0.5)	2.8 (0.5)	4.6 (1.2)	4.6 (0.8)	5.7 (1.4)	3.9 (1.2)	3.1 (0.9)			+	
Hispanic	*****(****)	2.2 (1.0)	2.3 (0.6)	4.1 (0.7)	4.4 (1.9)	3.9 (1.2)	6.0 (1.9)	4.3 (1.8)	5.5 (1.7)				
Other	8.5 (2.1)	11.2 (2.3)	9.0 (3.2)	12.2 (2.9)	18.4 (5.1)	8.3 (3.2)	20.8 (4.9)	15.9 (4.1)	11.8 (2.3)				
Grade													
Below Modal Grade	1.4 (0.3)	2.1 (0.3)	3.6 (0.5)	3.6 (0.4)	4.1 (0.9)	4.8 (0.5)	6.4 (0.9)	6.9 (0.8)	7.8 (1.0)	+		+	
At Modal Grade	12.9 (0.6)	13.2 (0.6)	14.4 (0.7)	15.0 (0.5)	15.0 (1.1)	14.9 (1.0)	20.9 (1.2)	19.8 (1.0)	17.5 (1.5)	+		+	
Above Modal Grade	22.4 (3.9)	27.7 (6.2)	19.7 (9.0)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	12.5 (1.1)	11.1 (1.3)	11.8 (1.1)	12.5 (0.4)	12.5 (1.7)	12.1 (1.4)	19.7 (2.4)	20.5 (1.7)	14.3 (2.0)			+	
Southeast	6.3 (0.6)	8.1 (0.7)	9.0 (1.1)	11.8 (1.2)	10.8 (1.8)	10.7 (1.4)	13.0 (1.5)	10.9 (2.0)	10.4 (2.1)			+	
Central	11.6 (1.0)	12.4 (0.9)	14.3 (0.7)	10.5 (0.6)	9.1 (1.3)	10.0 (1.6)	16.6 (2.3)	14.2 (1.7)	16.6 (2.0)				
West	8.2 (0.7)	8.9 (0.7)	10.0 (1.0)	9.5 (0.8)	11.4 (1.4)	11.3 (1.2)	12.5 (1.2)	12.1 (1.5)	14.2 (1.7)	+		+	
Parents' Education Level													
Less Than H.S.	3.0 (0.5)	3.1 (0.4)	2.6 (0.6)	3.5 (0.5)	4.9 (1.7)	4.0 (1.5)	3.4(****)	3.2 (1.7)	4.1 (2.1)				
Graduated H.S.	7.7 (0.5)	7.8 (0.5)	6.5 (0.4)	7.5 (0.6)	6.7 (1.2)	7.1 (0.9)	9.1 (1.1)	8.4 (1.3)	7.5 (1.4)				
Post H.S.	17.0 (0.8)	17.2 (0.7)	18.0 (0.8)	17.0 (0.6)	15.5 (1.3)	16.3 (1.3)	21.4 (1.5)	20.0 (0.9)	20.0 (1.6)			+	
Unknown	2.7 (0.3)	2.8 (0.5)	2.1 (0.5)	2.9 (0.6)	4.6 (1.2)	3.3 (1.2)	4.5 (1.4)	3.3 (1.5)	2.8 (1.7)				
Type of School													
Public	*****(****)	*****(****)	10.5(0.5)	10.0(0.4)	10.1(0.8)	10.1(0.7)	13.6(1.0)	12.6(0.8)	12.5(1.1)			+	
Non-Public	*****(****)	*****(****)	17.4(1.5)	19.0(1.6)	17.3(2.1)	17.2(3.0)	26.1(3.3)	26.6(3.2)	23.3(3.8)			+	
Quartiles													
Upper	35.3 (0.8)	39.4 (1.1)	38.1 (1.2)	40.7 (1.0)	39.8 (2.4)	40.9 (2.0)	54.0 (2.4)	50.2 (1.9)	49.5 (3.0)	+		+	+
Middle two	1.9 (0.2)	0.8 (0.1)	3.6 (0.3)	1.7 (0.2)	1.9 (0.4)	1.6 (0.4)	3.6 (0.6)	3.2 (0.5)	2.8 (0.7)			+	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.10

NAEP 1996 Reading Long-Term Trend Assessment — Age 13
Percentages of students with Reading scale scores at or above 350

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	0.1 (0.0)	0.2 (0.0)	0.2 (0.0)	0.3 (0.1)	0.2 (0.1)	0.4 (0.1)	0.6 (0.3)	0.5 (0.1)	0.5 (0.2)	+		+	
Gender													
Male	0.1 (0.0)	0.1 (0.1)	0.2 (0.1)	0.2 (0.1)	0.1(****)	0.2 (0.1)	0.4(****)	0.3 (0.2)	0.3 (0.2)				
Female	0.2 (0.1)	0.3 (0.1)	0.3 (0.1)	0.4 (0.1)	0.4 (0.2)	0.5 (0.2)	0.8 (0.3)	0.7 (0.2)	0.8 (0.2)			+	
Race/Ethnicity													
White	0.2 (0.1)	0.3 (0.1)	0.3 (0.1)	0.4 (0.1)	0.3 (0.1)	0.5 (0.2)	0.8 (0.3)	0.6 (0.2)	0.7 (0.2)	+		+	
Black	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.1(****)	0.0(****)	0.0(****)				
Hispanic	*****(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.1(****)	0.0(****)	0.1(****)	0.0(****)				
Other	0.2 (0.0)	0.3(****)	0.3(****)	0.8(****)	1.2(****)	0.2(****)	1.7(****)	0.3(****)	0.6 (0.4)				
Grade													
Below Modal Grade	0.0(****)	0.0(****)	0.0(****)	0.0 (0.0)	0.0(****)	0.1(****)	0.2(****)	0.1(****)	0.1 (0.1)	+			
At Modal Grade	0.2 (0.1)	0.3 (0.1)	0.3 (0.1)	0.4 (0.1)	0.3 (0.1)	0.5 (0.2)	0.8 (0.3)	0.7 (0.3)	0.8 (0.3)			+	
Above Modal Grade	0.4(****)	1.9 (1.3)	0.7(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
Region													
Northeast	0.2 (0.1)	0.3 (0.1)	0.2 (0.1)	0.3 (0.1)	0.4(****)	0.5 (0.3)	1.3 (0.8)	1.1 (0.4)	0.6 (0.3)				
Southeast	0.1(****)	0.1(****)	0.2 (0.1)	0.4 (0.1)	0.3(****)	0.4 (0.2)	0.5(****)	0.3(****)	0.4(****)				
Central	0.2 (0.1)	0.3 (0.1)	0.3 (0.1)	0.2 (0.1)	0.0(****)	0.3 (0.2)	0.4(****)	0.3(****)	0.7(****)				
West	0.1 (0.0)	0.2 (0.1)	0.2 (0.1)	0.3 (0.1)	0.2(****)	0.3 (0.2)	0.5(****)	0.3 (0.2)	0.5 (0.3)				
Parents' Education Level													
Less Than H.S.	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.0(****)				
Graduated H.S.	0.1 (0.0)	0.1 (0.1)	0.0(****)	0.1 (0.1)	0.1(****)	0.1(****)	0.1(****)	0.2(****)	0.1(****)				
Post H.S.	0.3 (0.1)	0.5 (0.1)	0.4 (0.1)	0.5 (0.1)	0.4 (0.1)	0.7 (0.2)	1.0 (0.4)	0.7 (0.2)	0.9 (0.3)	+		+	
Unknown	0.0(****)	0.0(****)	0.1(****)	0.1(****)	0.1(****)	0.1(****)	0.1(****)	0.0(****)	0.0(****)				
Type of School													
Public	*****(****)	*****(****)	0.2 (0.0)	0.3 (0.1)	0.2 (0.1)	0.3 (0.1)	0.5 (0.3)	0.3 (0.1)	0.5 (0.1)			+	
Non-Public	*****(****)	*****(****)	0.5 (0.2)	0.4 (0.2)	0.3(****)	0.8 (0.5)	1.2 (0.8)	1.5 (1.0)	1.1(****)				
Quartiles													
Upper	0.6 (0.2)	0.9 (0.2)	0.9 (0.2)	1.1 (0.3)	0.9 (0.3)	1.5 (0.4)	2.5 (1.0)	1.8 (0.5)	2.1 (0.6)	+		+	
Middle two	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.11

NAEP 1996 Reading Long-Term Trend Assessment — Age 17
Percentages of students with Reading scale scores at or above 150

	1971	1975	1980	1984	1988	1990	1992	1994	1996	* ‡ L Q
TOTAL	99.6 (0.1)	99.7 (0.1)	99.9 (0.1)	100.0 (0.0)	100.0(****)	99.9(****)	99.8 (0.1)	99.8 (0.1)	100.0(****)	
Gender										
Male	99.4 (0.1)	99.5 (0.2)	99.8 (0.1)	99.9 (0.0)	100.0(****)	99.8(****)	99.7 (0.2)	99.7(****)	99.9 (****)	
Female	99.8 (0.1)	99.8 (0.1)	99.9(****)	99.9(****)	100.0(****)	100.0(****)	99.9 (****)	99.9(****)	100.0(****)	
Race/Ethnicity										
White	99.9 (0.0)	99.9 (0.0)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9 (****)	100.0(****)	100.0(****)	
Black	97.6 (0.4)	97.7 (0.8)	99.0 (0.3)	99.9(****)	100.0(****)	99.6(****)	99.1(****)	99.5(****)	99.8 (****)	
Hispanic	*****(****)	99.3 (0.4)	99.8(****)	99.8(****)	99.9 (****)	99.7 (****)	99.8 (****)	99.0(****)	99.9 (****)	
Other	99.6(****)	100.0(****)	99.8(****)	99.3(****)	100.0(****)	99.9(****)	99.6(****)	99.8 (****)	100.0(****)	
Grade										
Below Modal Grade	97.7 (0.4)	98.0 (0.6)	99.1 (0.3)	99.8 (0.1)	100.0(****)	99.6(****)	99.3 (0.4)	99.4 (0.4)	99.9 (****)	
At Modal Grade	99.9 (****)	100.0 (****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	
Above Modal Grade	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9 (****)	100.0(****)	99.9 (****)	
Region										
Northeast	99.8 (0.1)	99.7 (0.2)	99.9 (****)	100.0(****)	100.0(****)	99.9(****)	99.7(****)	99.8(****)	100.0(****)	
Southeast	99.1 (0.2)	99.5 (0.1)	99.8 (0.1)	99.8(****)	100.0(****)	99.8(****)	99.7(****)	99.9(****)	99.9 (****)	
Central	99.8 (0.1)	99.8 (0.1)	99.9(****)	100.0(****)	100.0(****)	99.9(****)	99.8(****)	99.8(****)	100.0(****)	
West	99.7 (0.1)	99.5 (0.2)	99.9 (0.1)	99.9(****)	100.0(****)	99.9(****)	99.8 (0.1)	99.7(****)	100.0(****)	
Parents' Education Level										
Less Than H.S.	99.2 (0.2)	99.3 (0.2)	99.7 (0.1)	99.9(****)	100.0(****)	99.9(****)	99.8(****)	99.3(****)	100.0(****)	
Graduated H.S.	99.8 (0.1)	99.7 (0.2)	99.8 (0.1)	100.0 (0.0)	100.0(****)	100.0(****)	99.9(****)	99.8(****)	99.9 (****)	
Post H.S.	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.8 (****)	100.0(****)	100.0(****)	
Unknown	98.0 (0.5)	97.7 (0.9)	98.9 (0.6)	99.8(****)	100.0(****)	98.5(****)	99.5(****)	98.8(****)	99.8 (****)	
Type of School										
Public	*****(****)	*****(****)	99.9 (0.1)	99.9 (0.0)	100.0 (****)	99.9 (****)	99.8 (0.1)	99.8 (0.2)	100.0 (****)	
Non-Public	*****(****)	*****(****)	100.0 (****)	100.0 (****)	100.0(****)	100.0(****)	99.9 (****)	100.0 (****)	100.0(****)	
Quartiles										
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Lower	98.4 (0.2)	98.6 (0.4)	99.4 (0.2)	99.8 (0.1)	100.0(****)	99.5(****)	99.1 (0.5)	99.2 (0.6)	99.8 (****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.12

NAEP 1996 Reading Long-Term Trend Assessment — Age 17
Percentages of students with Reading scale scores at or above 200

THE NATION'S REPORT CARD naep

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	96.0 (0.3)	96.4 (0.3)	97.2 (0.3)	98.3 (0.1)	98.9 (0.3)	98.1 (0.3)	97.1 (0.4)	96.8 (0.5)	97.4 (0.5)	+		+	–
Gender													
Male	94.7 (0.4)	95.3 (0.4)	96.3 (0.5)	97.6 (0.2)	98.5 (0.5)	97.0 (0.6)	96.3 (0.7)	95.5 (0.9)	96.3 (0.8)			+	–
Female	97.3 (0.3)	97.5 (0.4)	98.1 (0.3)	99.0 (0.1)	99.3 (0.3)	99.2 (0.3)	97.9 (0.4)	98.0 (0.5)	98.6 (0.4)	+		+	–
Race/Ethnicity													
White	97.9 (0.2)	98.6 (0.1)	99.1 (0.1)	99.0 (0.1)	99.3 (0.3)	98.8 (0.2)	98.6 (0.3)	98.1 (0.4)	98.5 (0.4)				–
Black	81.9 (1.5)	82.0 (1.8)	85.6 (1.7)	95.9 (0.5)	98.0 (1.0)	95.7 (1.3)	91.6 (1.6)	93.4 (2.0)	94.8 (2.0)	+		+	–
Hispanic	*****(****)	88.7 (2.4)	93.3 (1.8)	95.6 (0.7)	96.3 (2.4)	95.9 (2.1)	93.4 (2.3)	91.1 (3.4)	94.0 (1.9)				
Other	95.2 (1.7)	96.4 (1.8)	97.9(****)	96.6 (1.1)	98.5(****)	98.3(****)	95.1 (2.0)	97.0 (2.0)	95.7 (1.9)				
Grade													
Below Modal Grade	81.8 (1.1)	83.9 (1.4)	86.5 (1.6)	94.4 (0.5)	97.1 (1.2)	94.2 (1.0)	92.2 (1.0)	92.2 (1.4)	94.2 (1.5)	+		+	–
At Modal Grade	98.2 (0.2)	98.6 (0.2)	98.9 (0.2)	99.3 (0.1)	99.5 (0.2)	99.4 (0.2)	99.0 (0.3)	98.8 (0.3)	99.0 (0.2)	+		+	–
Above Modal Grade	99.0(0.2)	99.1 (0.3)	99.3 (0.2)	99.6 (0.2)	99.6(****)	99.6(****)	98.6(****)	97.6 (1.4)	98.4 (1.1)				
Region													
Northeast	97.3 (0.4)	97.1 (0.5)	97.5 (0.5)	98.6 (0.3)	99.3(****)	98.9 (0.5)	98.1 (0.9)	97.1 (0.8)	97.6 (0.8)				
Southeast	92.2 (1.0)	94.2 (0.6)	95.6 (1.0)	98.0 (0.3)	98.6 (0.5)	97.5 (1.0)	95.1 (1.1)	96.8 (1.0)	96.2 (1.0)	+		+	–
Central	97.4 (0.4)	97.7 (0.4)	97.8 (0.6)	98.7 (0.2)	99.5(****)	98.2 (0.5)	98.7 (0.6)	96.5 (1.7)	98.3 (0.7)				
West	96.1 (0.6)	95.9 (0.9)	97.6 (0.5)	98.0 (0.3)	98.5 (0.6)	97.8 (0.8)	96.6 (0.8)	96.6 (0.9)	97.6 (0.7)				
Parents' Education Level													
Less Than H.S.	91.2 (0.8)	92.3 (0.8)	93.1 (0.8)	96.5 (0.4)	97.6 (1.2)	96.3 (1.8)	94.3 (1.7)	94.3 (2.1)	95.3 (1.7)			+	–
Graduated H.S.	96.7 (0.3)	97.0 (0.6)	97.0 (0.4)	98.1 (0.2)	98.8 (0.4)	98.2 (0.6)	96.8 (0.7)	95.9 (1.1)	95.5 (1.0)				–
Post H.S.	99.1 (0.1)	99.0 (0.2)	99.2 (0.2)	99.3 (0.1)	99.6 (0.2)	99.2 (0.3)	98.1 (0.5)	98.4 (0.4)	99.0 (0.4)				
Unknown	88.0 (1.6)	79.6 (2.3)	85.2 (3.2)	92.8 (1.4)	92.8(****)	84.6 (4.5)	90.4 (4.8)	82.2 (5.3)	86.7 (4.9)				
Type of School													
Public	*****(****)	*****(****)	97.1(0.4)	98.1(0.1)	98.8(0.3)	98.0(0.3)	96.8(0.4)	96.6(0.5)	97.3(0.5)				–
Non–Public	*****(****)	*****(****)	99.0(0.4)	99.6(0.2)	99.8(0.1)	99.6(****)	99.3(****)	97.9(****)	98.6(****)				
Quartiles													
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	84.1 (0.8)	85.8 (1.1)	89.0 (1.0)	93.2 (0.5)	95.8 (1.2)	92.4 (1.2)	88.3 (1.5)	87.1 (1.8)	89.7 (2.1)	+		+	–

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.13

NAEP 1996 Reading Long-Term Trend Assessment — Age 17
Percentages of students with Reading scale scores at or above 250

THE NATION'S REPORT CARD

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	78.6 (0.9)	80.1 (0.7)	80.7 (0.9)	83.1 (0.5)	85.7 (0.8)	84.1 (1.0)	82.5 (0.8)	80.8 (1.0)	81.4 (0.9)	+		+	-
Gender													
Male	74.4 (1.0)	75.6 (0.8)	77.9 (1.0)	79.6 (0.6)	82.9 (1.4)	79.7 (1.4)	78.4 (1.2)	76.2 (1.5)	76.7 (1.2)			+	-
Female	82.6 (1.0)	84.3 (0.9)	83.6 (1.0)	86.8 (0.6)	88.2 (1.1)	88.6 (1.0)	86.8 (1.1)	85.6 (1.2)	86.4 (1.1)	+		+	-
Race/Ethnicity													
White	83.7 (0.7)	86.2 (0.6)	86.9 (0.6)	88.0 (0.5)	88.7 (0.9)	88.3 (1.1)	88.0 (0.9)	86.2 (1.1)	86.8 (0.8)	+		+	-
Black	40.1 (1.6)	43.0 (1.6)	44.0 (2.0)	65.7 (1.2)	75.8 (2.4)	69.1 (2.8)	61.4 (2.3)	65.7 (4.1)	67.2 (4.1)	+		+	-
Hispanic	*****(****)	52.9 (4.1)	62.2 (3.1)	68.3 (2.1)	71.5 (4.8)	75.2 (4.7)	69.2 (4.0)	63.0 (4.4)	64.2 (4.4)				-
Other	72.1 (4.4)	70.4 (4.8)	77.0 (3.6)	77.8 (2.6)	86.5 (6.4)	83.0 (4.5)	79.3 (3.8)	77.2 (6.7)	73.6 (4.9)				
Grade													
Below Modal Grade	40.0 (1.7)	44.3 (1.9)	45.6 (2.4)	60.2 (1.2)	66.5 (2.5)	63.5 (2.5)	62.8 (1.9)	60.5 (2.4)	67.7 (2.0)	+		+	-
At Modal Grade	84.1 (0.8)	85.9 (0.6)	86.0 (0.8)	89.0 (0.4)	91.1 (0.9)	91.2 (0.8)	90.6 (0.8)	89.4 (0.8)	88.1 (0.8)	+		+	-
Above Modal Grade	89.5 (1.0)	90.1 (1.0)	89.9 (1.1)	92.0 (0.8)	94.4 (2.0)	93.4 (1.8)	87.8 (2.5)	87.8 (3.3)	85.6 (2.5)				-
Region													
Northeast	82.4 (2.0)	82.6 (1.5)	80.9 (1.9)	85.5 (1.1)	88.5 (1.9)	86.2 (1.1)	86.1 (2.0)	85.8 (2.3)	84.4 (2.2)				
Southeast	67.8 (2.0)	73.1 (1.3)	76.2 (2.3)	80.1 (1.1)	82.6 (2.1)	80.8 (2.0)	74.4 (2.5)	78.1 (2.7)	75.6 (1.7)	+		+	-
Central	82.8 (1.4)	84.9 (1.2)	82.8 (1.7)	84.6 (1.1)	87.3 (1.7)	86.9 (1.6)	87.1 (1.7)	80.2 (3.1)	85.4 (1.6)				
West	78.2 (1.5)	77.2 (1.7)	81.9 (1.3)	83.4 (0.8)	84.4 (1.6)	82.6 (2.4)	82.8 (1.5)	79.9 (1.7)	80.6 (2.1)				-
Parents' Education Level													
Less Than H.S.	60.8 (1.4)	63.3 (1.4)	63.4 (1.8)	70.0 (1.2)	68.8 (3.4)	71.2 (2.9)	69.1 (3.1)	68.9 (2.5)	66.8 (3.9)			+	
Graduated H.S.	78.5 (1.1)	79.3 (0.9)	76.5 (1.1)	79.7 (0.8)	82.1 (1.3)	81.3 (1.6)	77.9 (1.6)	74.0 (2.0)	72.7 (1.6)	-			-
Post H.S.	90.0 (0.6)	89.7 (0.6)	89.8 (0.6)	90.6 (0.4)	91.7 (0.9)	89.8 (1.0)	87.9 (1.0)	87.4 (1.1)	88.1 (1.0)				-
Unknown	61.4 (4.3)	42.6 (2.5)	51.2 (3.1)	56.7 (2.3)	54.0 (7.3)	47.8 (5.2)	55.0 (8.5)	44.3 (8.0)	52.9 (7.4)				
Type of School													
Public	*****(****)	*****(****)	79.9(1.0)	82.1(0.5)	84.6(0.8)	83.3(1.0)	81.3(0.8)	79.7(1.2)	81.1(0.9)				-
Non-Public	*****(****)	*****(****)	90.3(1.8)	92.3(1.3)	92.9(1.9)	95.0(1.9)	94.1(2.3)	90.0(2.9)	85.0(2.9)				-
Quartiles													
Upper	99.8 (0.1)	100.0(****)	99.7 (0.1)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	93.7 (0.5)	96.1 (0.4)	93.5 (0.4)	96.9 (0.2)	98.0 (0.4)	97.4 (0.6)	97.1 (0.6)	95.8 (0.8)	95.5 (0.7)			+	-
Lower	27.1 (1.0)	28.2 (1.1)	36.0 (1.4)	38.7 (0.8)	46.6 (2.7)	41.7 (3.4)	35.6 (2.1)	31.7 (1.9)	34.7 (2.2)	+		+	-

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table C.14

NAEP 1996 Reading Long-Term Trend Assessment — Age 17
Percentages of students with Reading scale scores at or above 300

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	39.0 (1.0)	38.7 (0.8)	37.8 (1.1)	40.3 (0.8)	40.9 (1.5)	41.4 (1.0)	43.2 (1.1)	41.0 (1.2)	38.6 (1.4)			+	
Gender													
Male	33.9 (1.1)	33.7 (1.0)	35.0 (1.3)	35.4 (0.8)	37.1 (2.3)	36.1 (1.5)	38.4 (1.6)	35.6 (1.9)	32.8 (2.1)				
Female	44.0 (1.2)	43.6 (0.9)	40.7 (1.2)	45.0 (0.9)	44.4 (2.0)	46.8 (1.3)	48.5 (1.5)	46.5 (1.5)	44.7 (1.6)			+	
Race/Ethnicity													
White	43.2 (0.9)	43.9 (0.8)	43.3 (1.1)	46.3 (0.9)	45.4 (1.6)	47.5 (1.2)	50.1 (1.4)	47.7 (1.4)	45.1 (1.6)			+	
Black	7.7 (0.9)	8.1 (0.7)	7.1 (0.8)	16.2 (0.9)	24.9 (3.1)	19.7 (1.8)	16.9 (2.5)	21.5 (3.7)	18.0 (2.1)	+		+	
Hispanic	*****(****)	12.6 (2.7)	16.5 (2.1)	21.2 (2.3)	23.3 (3.7)	27.1 (3.3)	27.3 (3.2)	20.1 (3.0)	20.0 (4.7)			+	
Other	31.7 (3.4)	28.1 (4.1)	32.3 (3.7)	38.3 (3.3)	40.3 (5.7)	40.4 (6.1)	42.5 (6.4)	39.2 (7.8)	36.6 (6.4)				
Grade													
Below Modal Grade	7.4 (0.8)	7.7 (0.8)	7.8 (1.0)	13.5 (0.9)	15.7 (2.5)	14.8 (1.7)	17.8 (1.7)	17.1 (1.9)	19.0 (2.3)	+		+	
At Modal Grade	42.6 (1.0)	43.0 (0.8)	41.6 (1.2)	46.0 (0.8)	47.2 (1.8)	49.4 (1.1)	53.3 (1.5)	49.9 (1.4)	47.2 (1.7)			+	
Above Modal Grade	53.3 (1.8)	52.4 (1.1)	51.3 (2.2)	55.5 (1.5)	57.1 (4.6)	61.9 (3.6)	53.5 (3.8)	60.2 (5.2)	52.6 (4.0)				
Region													
Northeast	44.3 (2.6)	41.6 (1.4)	38.0 (2.6)	42.9 (2.3)	46.9 (3.1)	46.6 (2.2)	51.0 (3.1)	49.0 (3.7)	42.4 (3.4)				
Southeast	28.2 (1.6)	31.8 (1.4)	33.8 (1.8)	36.4 (1.6)	36.4 (2.5)	36.9 (2.7)	33.5 (2.3)	35.7 (2.7)	31.0 (2.8)				–
Central	43.2 (1.9)	43.6 (1.5)	39.0 (2.4)	41.4 (1.6)	40.2 (4.2)	44.5 (2.4)	45.4 (2.7)	38.7 (3.0)	43.3 (2.6)				
West	37.2 (1.5)	35.4 (1.5)	39.6 (2.2)	40.4 (1.2)	40.3 (2.4)	38.0 (2.8)	44.0 (2.5)	41.7 (2.7)	38.0 (2.9)				
Parents' Education Level													
Less Than H.S.	19.5 (1.0)	19.0 (1.2)	17.0 (1.3)	21.1 (1.2)	17.6 (3.9)	20.4 (2.6)	26.0 (3.4)	21.7 (3.9)	21.1 (3.2)				
Graduated H.S.	35.9 (1.1)	33.2 (0.8)	29.3 (0.9)	31.6 (0.9)	30.9 (1.7)	32.3 (1.6)	33.8 (2.2)	28.9 (2.1)	25.1 (2.2)	–		–	
Post H.S.	53.4 (1.1)	52.1 (1.0)	50.2 (1.1)	53.0 (1.0)	50.8 (1.9)	51.1 (1.2)	51.5 (1.4)	50.4 (1.3)	47.6 (1.7)	–		–	
Unknown	22.6 (3.3)	9.2 (1.7)	12.4 (2.1)	13.6 (2.0)	14.5 (5.7)	11.5 (3.7)	14.0 (3.6)	9.9 (3.2)	12.2 (4.8)				
Type of School													
Public	*****(****)	*****(****)	36.8(1.2)	38.7(0.7)	39.5(1.6)	39.8(1.0)	41.3(1.0)	39.1(1.4)	38.0(1.6)				
Non–Public	*****(****)	*****(****)	49.9(3.3)	54.4(2.3)	50.4(5.7)	63.0(5.9)	62.6(5.3)	57.3(5.2)	44.9(5.7)				
Quartiles													
Upper	89.0 (0.8)	93.1 (0.5)	85.2 (0.7)	90.9 (0.5)	91.9 (1.1)	93.6 (1.4)	93.5 (1.1)	93.9 (1.1)	91.9 (1.4)			+	
Middle two	33.3 (0.8)	30.8 (1.0)	32.5 (0.8)	34.0 (0.8)	35.6 (2.1)	35.8 (1.3)	39.5 (1.5)	34.8 (1.2)	30.9 (2.5)				
Lower	0.5 (0.2)	0.1 (0.1)	1.1 (0.3)	0.5 (0.1)	0.5(****)	0.6(****)	0.5(****)	0.5 (0.3)	0.4(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table C.15

NAEP 1996 Reading Long-Term Trend Assessment — Age 17
Percentages of students with Reading scale scores at or above 350

	1971	1975	1980	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	5.8 (0.4)	6.2 (0.3)	5.3 (0.4)	5.7 (0.3)	4.6 (0.6)	7.0 (0.5)	6.8 (0.6)	7.3 (0.7)	6.4 (0.8)				+
Gender													
Male	5.2 (0.4)	5.1 (0.5)	4.5 (0.4)	4.8 (0.4)	3.5 (0.9)	5.6 (0.5)	5.3 (0.7)	5.4 (0.9)	4.4 (1.0)				
Female	8.4 (0.5)	7.3 (0.4)	6.0 (0.6)	6.7 (0.4)	5.5 (0.8)	8.5 (0.7)	8.4 (0.7)	9.2 (0.9)	8.5 (1.2)				+
Race/Ethnicity													
White	7.7 (0.4)	7.2 (0.4)	6.2 (0.4)	6.9 (0.4)	5.5 (0.7)	8.7 (0.6)	8.3 (0.8)	8.8 (0.9)	8.0 (1.0)				+
Black	0.4 (0.1)	0.4 (0.3)	0.2(****)	0.9 (0.3)	1.4 (0.7)	1.5 (1.0)	1.6 (0.9)	2.3 (1.2)	1.7 (1.0)				
Hispanic	*****(****)	1.2 (0.6)	1.3 (0.4)	2.0 (0.4)	1.3(****)	2.4 (1.4)	2.3 (0.8)	1.9 (1.1)	1.6(****)				
Other	4.0 (1.9)	3.8(****)	3.8 (2.5)	7.0 (1.2)	4.2(****)	6.2 (2.6)	7.1 (2.3)	9.5 (5.4)	4.7 (2.4)				
Grade													
Below Modal Grade	0.5 (0.2)	0.3 (0.1)	0.3 (0.2)	0.6 (0.2)	1.4 (0.7)	1.0 (0.2)	0.8 (0.4)	1.2 (0.7)	1.9 (0.8)			+	
At Modal Grade	7.1 (0.4)	6.7 (0.4)	5.7 (0.4)	6.6 (0.3)	5.2 (0.7)	8.4 (0.6)	9.0 (0.7)	9.1 (1.0)	8.2 (1.1)			+	+
Above Modal Grade	12.1 (1.3)	11.0 (1.0)	9.5 (1.7)	10.1 (1.0)	7.3 (2.9)	14.7 (2.6)	10.9 (3.1)	15.7 (3.8)	10.7 (3.9)				
Region													
Northeast	8.7 (1.1)	7.6 (1.0)	5.6 (0.7)	6.1 (0.6)	5.6 (1.6)	9.5 (1.2)	9.5 (1.8)	11.4 (2.5)	8.0 (2.2)				
Southeast	3.9 (0.6)	4.5 (0.5)	4.4 (0.9)	5.3 (0.5)	4.1 (1.3)	5.8 (1.1)	4.3 (1.2)	5.5 (1.5)	4.4 (1.8)				
Central	7.8 (0.8)	7.1 (0.5)	5.0 (0.6)	5.6 (0.5)	4.4 (0.7)	7.4 (1.2)	6.2 (0.7)	6.0 (1.0)	7.7 (1.3)				+
West	6.0 (0.6)	5.1 (0.5)	5.8 (0.7)	5.8 (0.7)	4.2 (0.8)	5.7 (1.0)	7.3 (1.0)	6.7 (1.1)	5.6 (1.5)				
Parents' Education Level													
Less Than H.S.	1.9 (0.3)	1.6 (0.3)	1.0 (0.3)	1.4 (0.3)	1.0(****)	1.8 (0.8)	2.4 (1.4)	1.3 (0.8)	1.5(****)				
Graduated H.S.	4.9 (0.4)	3.8 (0.4)	2.6 (0.2)	2.9 (0.3)	1.8 (0.7)	3.9 (0.7)	3.2 (0.5)	2.8 (0.7)	2.4 (0.6)	–		–	
Post H.S.	11.3 (0.6)	10.1 (0.6)	8.3 (0.6)	8.9 (0.5)	6.7 (1.0)	9.8 (0.7)	9.4 (0.8)	10.3 (1.0)	8.9 (1.1)				+
Unknown	2.6 (0.4)	0.3 (0.0)	1.1(****)	0.6 (0.3)	0.2(****)	0.3(****)	0.8(****)	0.4(****)	0.6(****)				
Type of School													
Public	*****(****)	*****(****)	5.1(0.4)	5.3(0.3)	4.4(0.6)	6.5(0.5)	6.2(0.6)	6.3(0.5)	6.2(0.8)			+	
Non-Public	*****(****)	*****(****)	7.7(1.3)	9.2(1.0)	5.6(2.4)	13.7(2.7)	13.1(2.9)	15.4(3.7)	8.7(4.1)				
Quartiles													
Upper	24.9 (0.9)	24.5 (0.9)	18.7 (1.0)	21.7 (1.1)	17.6 (2.1)	26.9 (1.6)	26.1 (2.0)	27.9 (2.3)	24.3 (2.4)				+
Middle two	1.2 (0.2)	0.2 (0.1)	1.2 (0.2)	0.5 (0.1)	0.3 (0.2)	0.6 (0.3)	0.6 (0.3)	0.6 (0.3)	0.6 (0.4)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears, statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1977.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table C.16

NAEP 1996 Long-Term Trend Reading Results — Age 9

Scale Score Means, Standard Deviations, and Percentiles

	1971	1975	1980	1984	1988	1990	1992	1994	1996
TOTAL									
Mean	207.6 (1.0)	210.0 (0.7)	215.0 (1.0)	210.9 (0.7)	211.8 (1.1)	209.2 (1.2)	210.5 (0.9)	211.0 (1.2)	212.4 (1.0)
Standard Deviation	42.1 (0.4)	38.6 (0.3)	37.9 (0.4)	41.1 (0.4)	41.2 (1.0)	44.7 (0.8)	40.3 (0.6)	40.5 (0.8)	40.5 (0.8)
Percentiles									
5	134.8 (2.0)	143.2 (1.3)	148.5 (1.6)	140.5 (1.2)	141.9 (3.6)	134.8 (3.2)	140.7 (1.6)	140.1 (2.6)	141.8 (2.8)
10	151.6 (1.6)	159.2 (1.1)	165.1 (1.4)	156.7 (1.2)	156.7 (2.1)	150.1 (1.9)	156.0 (1.5)	155.6 (2.5)	157.6 (2.3)
25	180.0 (1.3)	185.2 (0.8)	191.1 (1.2)	183.7 (1.2)	184.3 (1.8)	178.7 (1.8)	183.1 (1.5)	184.1 (1.9)	185.0 (1.3)
50	209.3 (1.0)	211.9 (0.8)	217.2 (0.9)	212.6 (1.0)	213.7 (1.4)	210.3 (1.5)	213.6 (0.9)	214.8 (1.1)	215.5 (1.3)
75	236.7 (1.0)	236.5 (0.9)	241.3 (1.0)	239.6 (0.9)	240.1 (1.3)	240.3 (1.8)	239.3 (1.2)	240.0 (1.5)	241.4 (1.1)
90	260.5 (0.8)	258.1 (0.8)	261.7 (1.1)	262.8 (0.9)	263.0 (1.7)	265.7 (1.8)	259.9 (1.2)	260.1 (1.6)	261.5 (1.2)
95	274.1 (0.9)	270.6 (1.1)	273.3 (1.6)	276.5 (1.4)	277.5 (2.0)	280.4 (1.3)	272.1 (1.2)	271.7 (1.5)	274.1 (1.2)
Male Students									
Mean	201.2 (1.1)	204.3 (0.8)	210.0 (1.1)	207.5 (1.0)	207.5 (1.4)	204.0 (1.7)	205.9 (1.3)	207.3 (1.3)	206.8 (1.5)
Standard Deviation	42.1 (0.5)	39.0 (0.5)	38.7 (0.5)	42.3 (0.5)	42.7 (1.2)	45.1 (1.0)	41.3 (0.6)	41.9 (1.0)	41.0 (1.1)
Percentiles									
5	128.9 (2.0)	136.6 (1.1)	141.9 (2.3)	136.0 (1.1)	136.5 (2.9)	129.6 (5.8)	136.6 (2.0)	136.0 (1.7)	136.9 (2.5)
10	145.0 (1.7)	152.6 (1.3)	158.7 (1.4)	151.1 (1.5)	151.1 (2.4)	145.1 (1.9)	150.5 (2.1)	150.5 (2.2)	151.9 (2.3)
25	173.6 (1.4)	178.9 (1.0)	185.3 (1.4)	178.5 (1.1)	178.4 (1.8)	172.2 (2.8)	176.8 (1.7)	178.9 (3.2)	178.4 (2.4)
50	202.8 (1.2)	206.1 (0.9)	212.5 (1.2)	209.1 (1.3)	209.7 (1.8)	204.4 (2.2)	208.3 (1.6)	210.6 (1.6)	209.1 (2.6)
75	230.4 (1.1)	231.4 (1.0)	237.1 (1.1)	237.7 (1.2)	237.1 (1.9)	236.1 (1.9)	235.5 (1.6)	237.3 (2.0)	237.0 (1.6)
90	254.6 (1.2)	253.0 (1.1)	257.5 (0.8)	261.1 (1.1)	260.3 (2.0)	261.7 (2.6)	257.3 (1.0)	259.6 (1.9)	257.5 (1.7)
95	268.4 (1.5)	265.4 (1.4)	268.7 (1.1)	275.1 (1.1)	275.1 (2.3)	276.1 (5.6)	269.9 (2.8)	271.4 (4.1)	269.3 (3.2)
Female Students									
Mean	213.9 (1.0)	215.8 (0.8)	220.1 (1.1)	214.4 (0.9)	216.3 (1.3)	214.5 (1.2)	215.4 (0.9)	214.7 (1.4)	218.0 (1.2)
Standard Deviation	41.0 (0.6)	37.3 (0.4)	36.5 (0.5)	39.6 (0.5)	39.2 (1.2)	43.6 (1.3)	38.8 (0.9)	38.7 (1.1)	39.3 (0.9)
Percentiles									
5	142.9 (2.1)	151.3 (1.4)	157.1 (1.8)	146.4 (2.1)	149.3 (5.5)	140.6 (3.9)	147.3 (3.3)	145.9 (3.0)	148.8 (2.2)
10	159.5 (1.3)	167.1 (1.1)	172.5 (1.7)	162.9 (1.6)	164.3 (4.6)	156.8 (3.2)	163.8 (2.3)	162.2 (2.7)	165.2 (2.3)
25	186.7 (1.2)	192.0 (1.0)	197.2 (1.2)	188.7 (1.0)	190.6 (2.4)	185.7 (1.7)	190.0 (1.4)	189.4 (2.1)	192.4 (2.4)
50	215.6 (1.1)	217.2 (0.9)	221.7 (1.1)	215.7 (1.0)	217.5 (2.0)	215.9 (1.3)	218.5 (1.3)	218.6 (1.7)	221.1 (2.3)
75	242.4 (1.1)	241.1 (1.0)	245.2 (1.1)	241.6 (1.0)	242.6 (1.1)	244.4 (1.9)	242.5 (1.3)	241.9 (1.7)	245.3 (1.9)
90	265.0 (0.9)	262.3 (1.0)	265.5 (1.7)	264.4 (1.3)	265.3 (2.2)	269.4 (1.9)	262.3 (1.9)	260.6 (1.9)	265.3 (1.4)
95	278.6 (1.5)	274.8 (1.1)	277.0 (1.5)	277.8 (2.0)	279.1 (3.4)	284.1 (2.1)	273.7 (2.0)	272.0 (1.3)	278.0 (3.6)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.16
(continued)

NAEP 1996 Long-Term Trend Reading Results — Age 9
Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD naep

	1971	1975	1980	1984	1988	1990	1992	1994	1996
White Students									
Mean	214.0 (0.9)	216.6 (0.7)	221.3 (0.8)	218.2 (0.9)	217.7 (1.4)	217.0 (1.3)	217.9 (1.0)	218.0 (1.3)	219.9 (1.2)
Standard Deviation	39.4 (0.4)	36.1 (0.3)	35.2 (0.3)	38.8 (0.3)	39.3 (1.0)	42.9 (1.0)	37.5 (0.7)	37.4 (0.9)	38.0 (0.9)
Percentiles									
5	146.3 (2.4)	154.4 (1.2)	160.7 (1.5)	152.0 (1.3)	150.2 (3.4)	144.2 (3.2)	152.8 (1.6)	152.4 (2.0)	153.7 (2.9)
10	162.4 (1.3)	169.8 (1.1)	175.3 (1.0)	167.1 (1.0)	165.0 (3.9)	160.0 (1.5)	167.0 (1.8)	167.5 (2.6)	168.8 (3.1)
25	188.1 (1.2)	193.3 (0.7)	199.0 (0.9)	192.4 (1.0)	191.8 (2.4)	188.0 (2.8)	192.8 (1.3)	193.7 (1.8)	194.9 (1.7)
50	215.2 (0.9)	217.9 (0.7)	222.8 (0.8)	219.5 (1.0)	219.1 (1.2)	218.4 (2.1)	220.6 (1.3)	221.1 (1.4)	222.7 (1.7)
75	241.0 (0.9)	241.0 (0.9)	245.7 (0.9)	244.9 (0.9)	244.3 (1.8)	246.7 (2.3)	244.2 (1.2)	244.0 (1.5)	246.2 (1.5)
90	263.6 (0.8)	261.6 (1.0)	265.1 (1.1)	267.2 (1.3)	266.7 (2.2)	270.9 (2.1)	264.0 (1.0)	263.3 (1.5)	265.8 (1.2)
95	276.7 (0.9)	273.8 (1.3)	276.4 (1.2)	280.2 (1.3)	280.6 (2.6)	285.3 (2.6)	275.9 (3.1)	274.9 (1.8)	278.7 (1.2)
Black Students									
Mean	170.1 (1.7)	181.2 (1.2)	189.3 (1.8)	185.7 (1.4)	188.5 (2.4)	181.8 (2.9)	184.5 (2.2)	185.4 (2.3)	190.0 (2.7)
Standard Deviation	38.3 (0.7)	35.8 (0.6)	37.6 (1.0)	38.9 (0.9)	39.4 (1.6)	41.7 (1.7)	39.8 (1.3)	40.6 (2.4)	40.1 (1.4)
Percentiles									
5	106.7 (2.5)	118.8 (2.3)	123.1 (4.1)	120.8 (2.2)	124.7 (6.3)	115.0 (4.7)	119.3 (6.1)	119.1 (3.7)	123.1 (4.5)
10	120.0 (2.0)	133.7 (2.8)	139.4 (4.0)	135.1 (2.8)	138.3 (3.4)	128.9 (3.9)	132.4 (3.6)	132.7 (4.7)	136.2 (7.1)
25	143.4 (2.0)	157.5 (2.3)	165.3 (1.9)	159.3 (1.8)	161.8 (3.0)	152.5 (3.2)	156.3 (4.4)	155.3 (4.1)	160.8 (4.4)
50	171.0 (2.1)	182.8 (1.2)	191.7 (2.1)	186.5 (1.5)	188.3 (4.0)	181.8 (3.1)	185.1 (2.5)	186.4 (4.7)	190.1 (3.8)
75	196.3 (1.8)	206.5 (1.2)	215.6 (1.9)	212.5 (1.6)	216.5 (2.9)	210.5 (2.4)	213.5 (2.6)	216.2 (5.1)	219.8 (4.2)
90	218.9 (1.6)	226.3 (1.5)	236.3 (1.9)	235.3 (2.5)	238.2 (3.8)	236.3 (2.7)	235.5 (2.9)	237.2 (2.6)	242.4 (3.6)
95	232.4 (1.7)	237.2 (2.0)	247.1 (1.8)	248.4 (2.0)	252.2 (4.6)	250.7 (6.9)	248.7 (2.5)	248.0 (4.7)	255.0 (6.2)
Hispanic Students									
Mean	0.0 (0.0)	182.7 (2.2)	190.2 (2.3)	187.1 (3.1)	193.7 (3.5)	189.4 (2.3)	191.7 (3.1)	185.9 (3.9)	194.1 (3.5)
Standard Deviation	0.0 (0.0)	36.8 (1.3)	38.2 (1.2)	39.2 (1.5)	41.5 (2.8)	39.7 (1.6)	40.3 (1.8)	41.4 (2.0)	40.8 (1.9)
Percentiles									
5	0.0 (0.0)	120.3 (4.9)	123.4 (3.1)	120.3 (5.1)	121.8 (11.3)	125.4 (8.9)	124.8 (6.2)	118.9 (5.5)	124.0 (6.5)
10	0.0 (0.0)	133.4 (5.2)	138.4 (4.1)	134.7 (7.2)	140.3 (7.7)	139.0 (4.3)	138.7 (5.6)	153.7 (13.5)	138.7 (5.8)
25	0.0 (0.0)	157.4 (3.0)	164.3 (3.9)	160.7 (2.4)	164.9 (5.1)	160.8 (1.9)	162.5 (6.0)	157.0 (4.4)	166.0 (7.8)
50	0.0 (0.0)	184.2 (2.9)	192.0 (3.3)	189.2 (2.3)	196.0 (3.4)	189.3 (3.5)	192.7 (4.6)	184.1 (6.9)	197.2 (4.6)
75	0.0 (0.0)	209.4 (3.4)	217.6 (3.0)	215.4 (2.3)	222.0 (6.0)	218.9 (4.0)	222.0 (2.3)	215.7 (5.3)	223.2 (4.6)
90	0.0 (0.0)	228.6 (3.6)	237.8 (2.7)	236.1 (2.2)	246.7 (8.0)	239.3 (5.7)	244.7 (5.6)	242.8 (2.8)	245.6 (8.5)
95	0.0 (0.0)	240.3 (2.6)	249.9 (4.3)	247.1 (2.1)	258.6 (11.4)	253.2 (6.7)	255.4 (10.4)	255.0 (6.9)	256.5 (6.8)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.17

NAEP 1996 Long-Term Trend Reading Results — Age 13

Scale Score Means, Standard Deviations, and Percentiles

	1971	1975	1980	1984	1988	1990	1992	1994	1996
TOTAL									
Mean	255.2 (0.9)	255.9 (0.8)	258.5 (0.9)	257.1 (0.6)	257.5 (1.0)	256.8 (0.8)	259.8 (1.2)	257.9 (0.9)	259.1 (0.9)
Standard Deviation	35.7 (0.4)	35.8 (0.3)	34.9 (0.4)	35.5 (0.3)	34.7 (0.5)	36.0 (0.6)	39.4 (0.8)	39.8 (0.7)	38.4 (0.9)
Percentiles									
5	192.8 (1.8)	193.5 (1.1)	199.1 (1.9)	196.7 (1.1)	199.5 (1.7)	195.7 (1.9)	190.9 (2.8)	188.2 (4.9)	191.5 (2.2)
10	207.8 (1.4)	208.7 (1.0)	212.8 (1.5)	210.2 (0.9)	212.9 (1.2)	209.8 (1.8)	207.9 (1.9)	205.1 (1.7)	208.5 (2.2)
25	232.3 (1.2)	232.9 (1.0)	235.3 (1.1)	233.9 (0.8)	234.2 (1.2)	233.2 (1.0)	234.7 (1.8)	232.5 (1.2)	234.8 (1.5)
50	257.0 (1.0)	257.7 (0.9)	259.6 (0.8)	258.2 (0.8)	257.9 (1.1)	257.3 (0.9)	261.6 (1.6)	260.1 (1.1)	261.2 (0.7)
75	279.9 (0.8)	280.6 (0.8)	282.8 (0.8)	281.6 (0.6)	281.4 (1.4)	281.5 (0.8)	287.0 (1.4)	285.2 (1.1)	285.5 (0.9)
90	299.6 (0.9)	300.5 (1.0)	302.3 (0.8)	301.7 (0.8)	301.6 (1.0)	302.0 (1.0)	309.2 (1.8)	307.4 (1.4)	306.5 (1.4)
95	310.8 (0.9)	311.8 (1.0)	313.9 (0.8)	313.7 (1.0)	313.7 (1.3)	314.4 (1.3)	321.9 (2.6)	320.3 (1.4)	319.4 (1.9)
Male Students									
Mean	249.6 (1.0)	249.6 (0.8)	254.3 (1.1)	252.7 (0.7)	251.8 (1.3)	250.5 (1.1)	254.1 (1.7)	250.6 (1.2)	252.5 (1.2)
Standard Deviation	35.9 (0.5)	35.7 (0.4)	35.0 (0.5)	35.8 (0.4)	35.3 (0.7)	36.0 (0.7)	40.4 (1.1)	40.0 (0.8)	38.8 (1.1)
Percentiles									
5	186.7 (1.6)	187.2 (1.1)	194.9 (1.9)	191.9 (1.0)	192.6 (2.5)	189.7 (2.2)	184.9 (3.7)	181.0 (4.4)	184.2 (4.3)
10	201.6 (1.6)	202.3 (1.5)	208.5 (1.5)	205.5 (1.2)	206.7 (1.8)	202.8 (1.4)	201.0 (2.8)	197.1 (2.9)	200.1 (2.4)
25	226.3 (1.2)	226.8 (1.1)	230.8 (1.2)	228.9 (1.1)	227.7 (2.1)	226.9 (1.9)	227.4 (2.1)	224.9 (1.6)	227.9 (2.7)
50	251.4 (0.8)	251.4 (0.9)	255.4 (1.1)	253.9 (0.9)	252.1 (2.1)	251.9 (1.3)	255.6 (2.4)	253.1 (1.8)	254.6 (1.4)
75	274.5 (0.8)	274.1 (0.8)	278.6 (1.2)	277.5 (1.0)	276.5 (2.0)	275.3 (1.2)	282.5 (1.5)	278.4 (1.6)	279.3 (1.3)
90	294.2 (1.0)	293.5 (1.0)	298.5 (1.2)	297.8 (1.0)	297.2 (1.5)	295.3 (1.2)	305.0 (3.4)	300.4 (2.1)	300.6 (1.6)
95	305.9 (1.3)	305.6 (1.7)	309.9 (0.9)	309.4 (1.2)	309.4 (2.8)	307.4 (3.2)	317.8 (3.1)	313.5 (1.5)	312.9 (2.5)
Female Students									
Mean	260.8 (0.9)	262.3 (0.9)	262.6 (0.9)	261.8 (0.7)	263.0 (1.0)	263.1 (1.1)	265.3 (1.2)	265.7 (1.2)	265.4 (1.2)
Standard Deviation	34.5 (0.4)	34.8 (0.4)	34.2 (0.4)	34.5 (0.3)	33.1 (0.6)	34.8 (0.7)	37.5 (0.8)	38.0 (0.8)	37.0 (0.8)
Percentiles									
5	200.9 (1.5)	202.1 (1.7)	204.2 (2.0)	203.0 (1.3)	207.3 (3.9)	205.3 (3.1)	199.3 (4.1)	199.6 (2.6)	201.6 (1.5)
10	215.2 (1.4)	215.9 (1.4)	218.0 (2.0)	216.8 (1.1)	221.0 (1.6)	217.9 (2.0)	216.8 (2.9)	216.0 (3.7)	217.5 (2.4)
25	238.5 (0.8)	239.8 (1.1)	240.0 (1.1)	239.1 (0.8)	240.0 (1.6)	240.0 (1.9)	241.5 (1.2)	242.0 (1.5)	241.8 (1.5)
50	262.4 (1.1)	264.2 (1.0)	263.4 (0.9)	262.7 (0.8)	263.0 (1.4)	263.0 (1.6)	266.6 (1.9)	267.1 (1.1)	267.0 (1.7)
75	285.0 (1.0)	286.6 (1.2)	286.3 (1.0)	285.4 (0.7)	285.8 (1.0)	286.6 (1.1)	290.8 (1.1)	291.9 (1.3)	291.0 (2.1)
90	303.8 (1.3)	305.4 (1.0)	305.6 (1.0)	305.5 (0.8)	305.2 (1.2)	308.1 (1.5)	312.8 (1.5)	313.0 (2.9)	311.5 (2.1)
95	314.6 (0.9)	316.1 (1.1)	317.3 (1.6)	317.5 (1.6)	317.7 (3.2)	319.4 (2.5)	324.5 (2.4)	325.1 (2.4)	324.2 (2.7)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.17
(continued)

NAEP 1996 Long-Term Trend Reading Results — Age 13

Scale Score Means, Standard Deviations, and Percentiles

	1971	1975	1980	1984	1988	1990	1992	1994	1996
White Students									
Mean	260.9 (0.7)	262.1 (0.7)	264.4 (0.7)	262.5 (0.6)	261.3 (1.1)	262.3 (0.9)	266.4 (1.2)	265.1 (1.1)	267.0 (1.0)
Standard Deviation	32.9 (0.3)	32.9 (0.3)	32.7 (0.3)	33.8 (0.4)	33.9 (0.5)	34.5 (0.6)	36.6 (0.7)	37.5 (0.9)	35.9 (0.8)
Percentiles									
5	204.6 (1.2)	206.3 (1.0)	209.0 (1.2)	204.9 (0.9)	204.0 (1.4)	204.1 (2.2)	204.0 (2.7)	199.8 (2.4)	204.7 (2.7)
10	217.9 (0.9)	219.2 (0.7)	221.8 (1.2)	218.3 (0.8)	217.1 (2.1)	217.3 (1.7)	218.7 (2.2)	217.0 (3.0)	220.6 (2.4)
25	239.4 (0.9)	240.7 (0.8)	242.8 (0.8)	240.6 (0.8)	238.3 (1.0)	239.6 (1.7)	242.5 (1.4)	241.9 (1.0)	244.6 (1.9)
50	262.0 (0.8)	263.1 (1.0)	265.1 (0.6)	263.4 (0.7)	262.2 (1.1)	262.6 (1.4)	267.5 (2.0)	266.9 (1.2)	268.5 (1.0)
75	283.5 (0.9)	284.6 (0.8)	286.9 (0.7)	285.6 (0.7)	285.1 (0.9)	285.6 (1.2)	291.5 (1.1)	290.4 (1.4)	291.3 (1.5)
90	302.2 (0.7)	303.5 (0.9)	305.7 (0.8)	305.0 (0.8)	304.2 (1.5)	306.0 (2.4)	312.4 (1.9)	311.4 (1.2)	311.0 (1.9)
95	313.1 (1.1)	314.3 (0.9)	316.9 (0.8)	316.8 (1.3)	315.8 (1.1)	318.1 (2.7)	324.4 (2.0)	323.7 (1.3)	323.5 (2.8)
Black Students									
Mean	222.4 (1.2)	225.7 (1.2)	232.8 (1.5)	236.3 (1.2)	242.9 (2.4)	241.5 (2.2)	237.6 (2.3)	234.3 (2.4)	235.6 (2.6)
Standard Deviation	33.5 (0.5)	34.9 (0.7)	32.7 (0.8)	34.1 (0.8)	32.1 (1.3)	35.3 (1.5)	39.8 (1.9)	38.0 (1.7)	35.7 (1.3)
Percentiles									
5	166.3 (1.5)	167.2 (2.5)	178.6 (2.4)	180.1 (2.0)	190.6 (3.4)	182.3 (5.3)	169.6 (10.1)	170.0 (3.7)	175.5 (3.4)
10	178.0 (2.2)	180.1 (2.5)	190.6 (3.3)	192.4 (1.9)	202.2 (3.3)	194.3 (7.3)	185.3 (3.3)	183.0 (6.6)	187.9 (8.1)
25	199.1 (1.9)	202.2 (1.3)	210.9 (1.8)	213.3 (2.6)	222.0 (2.4)	217.0 (3.2)	210.0 (3.0)	207.8 (2.3)	211.1 (4.9)
50	223.3 (1.4)	226.0 (1.7)	232.6 (1.3)	236.4 (1.3)	242.4 (2.7)	242.5 (4.0)	239.2 (2.3)	235.9 (3.0)	237.0 (3.1)
75	245.5 (1.4)	249.9 (1.5)	254.8 (1.9)	259.3 (1.1)	263.6 (4.5)	265.7 (2.5)	265.6 (2.8)	261.1 (4.7)	261.3 (4.0)
90	264.8 (1.3)	270.6 (1.2)	275.0 (1.7)	280.3 (1.9)	283.6 (4.7)	285.9 (4.9)	287.3 (3.1)	283.3 (2.8)	280.9 (3.1)
95	276.8 (2.3)	282.7 (2.3)	286.2 (1.5)	292.7 (1.6)	298.9 (2.2)	298.9 (3.0)	302.5 (4.9)	295.2 (5.4)	292.0 (2.6)
Hispanic Students									
Mean	0.0 (0.0)	232.5 (3.0)	237.2 (2.0)	239.6 (2.0)	240.1 (3.5)	237.8 (2.3)	239.2 (3.5)	235.1 (1.9)	239.9 (2.9)
Standard Deviation	0.0 (0.0)	34.5 (1.0)	32.7 (0.8)	34.9 (1.2)	34.6 (2.4)	35.9 (1.3)	40.4 (2.4)	37.6 (2.2)	37.8 (2.1)
Percentiles									
5	0.0 (0.0)	173.7 (6.9)	182.6 (4.8)	180.8 (2.9)	181.4 (6.9)	178.0 (9.6)	165.0 (13.0)	174.2 (5.7)	173.9 (8.9)
10	0.0 (0.0)	186.7 (2.8)	194.9 (4.5)	193.3 (3.3)	194.6 (3.8)	191.3 (4.9)	183.8 (8.0)	186.7 (6.4)	189.9 (5.5)
25	0.0 (0.0)	207.8 (3.0)	214.8 (3.0)	216.1 (2.5)	218.9 (6.1)	214.1 (4.1)	213.0 (5.7)	210.7 (4.9)	216.4 (3.2)
50	0.0 (0.0)	233.5 (3.6)	237.5 (2.4)	240.4 (2.5)	240.3 (4.1)	238.6 (4.1)	242.0 (10.6)	235.5 (4.2)	241.9 (3.3)
75	0.0 (0.0)	256.7 (4.8)	259.3 (1.9)	263.5 (2.3)	262.0 (5.4)	262.2 (3.1)	267.0 (7.7)	259.9 (3.7)	265.4 (2.3)
90	0.0 (0.0)	277.2 (2.3)	279.2 (2.9)	284.2 (2.2)	284.0 (8.7)	283.8 (6.0)	288.7 (8.0)	281.9 (8.4)	287.7 (4.2)
95	0.0 (0.0)	289.1 (3.5)	290.5 (1.5)	295.9 (3.1)	297.3 (10.1)	295.9 (4.5)	303.1 (7.7)	297.7 (15.6)	300.0 (5.3)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.18

NAEP 1996 Long-Term Trend Reading Results — Age 17

Scale Score Means, Standard Deviations, and Percentiles

	1971	1975	1980	1984	1988	1990	1992	1994	1996
TOTAL									
Mean	285.2 (1.2)	285.6 (0.8)	285.5 (1.2)	288.8 (0.8)	290.1 (1.0)	290.2 (1.1)	289.7 (1.1)	288.1 (1.3)	286.9 (1.1)
Standard Deviation	45.8 (0.5)	44.0 (0.6)	41.8 (0.6)	40.3 (0.3)	37.1 (0.7)	41.3 (0.7)	43.0 (0.6)	44.4 (1.0)	42.3 (0.8)
Percentiles									
5	206.1 (1.5)	209.3 (3.0)	213.0 (1.7)	219.9 (1.3)	226.1 (1.3)	220.0 (2.3)	214.3 (2.9)	210.8 (3.6)	213.2 (2.4)
10	225.3 (1.7)	228.4 (1.7)	230.6 (1.8)	236.0 (0.9)	241.5 (2.2)	236.9 (3.1)	232.7 (2.7)	230.0 (3.1)	231.4 (1.7)
25	255.9 (1.6)	257.8 (1.1)	258.7 (1.2)	262.5 (1.1)	265.7 (1.8)	263.5 (1.3)	262.6 (1.1)	259.8 (1.8)	259.1 (1.3)
50	287.7 (1.4)	287.9 (0.7)	287.5 (1.4)	290.3 (0.9)	291.1 (1.9)	291.1 (1.3)	293.0 (1.2)	289.9 (1.8)	288.2 (1.8)
75	316.7 (1.0)	315.7 (0.7)	314.6 (1.2)	316.8 (0.9)	316.0 (1.4)	318.6 (1.5)	319.4 (1.4)	318.7 (1.8)	315.8 (1.7)
90	341.7 (1.1)	340.0 (0.9)	337.5 (1.4)	339.6 (0.7)	336.9 (2.1)	342.7 (2.1)	342.7 (1.8)	343.0 (1.8)	340.4 (1.7)
95	356.5 (1.5)	354.3 (0.7)	350.9 (1.3)	352.6 (1.0)	348.7 (1.8)	356.0 (1.7)	355.8 (1.9)	357.7 (1.7)	354.4 (2.6)
Male Students									
Mean	278.9 (1.2)	279.7 (1.0)	281.8 (1.3)	283.9 (0.8)	286.0 (1.5)	284.0 (1.6)	284.2 (1.6)	281.7 (2.2)	279.9 (1.3)
Standard Deviation	46.3 (0.6)	45.1 (0.6)	42.7 (0.6)	40.9 (0.4)	37.5 (1.2)	42.6 (0.8)	43.8 (0.8)	45.0 (1.3)	42.5 (1.2)
Percentiles									
5	198.3 (1.6)	201.6 (1.4)	207.2 (1.9)	214.3 (1.5)	222.0 (2.3)	209.4 (3.2)	208.1 (3.7)	202.8 (4.5)	205.6 (3.0)
10	218.2 (2.0)	220.8 (2.0)	225.4 (2.2)	230.1 (1.0)	236.3 (3.7)	228.2 (3.4)	226.0 (3.6)	221.1 (4.2)	223.2 (3.7)
25	249.1 (1.4)	250.9 (1.1)	254.4 (1.5)	257.0 (1.3)	261.6 (1.8)	257.3 (1.9)	255.4 (2.6)	251.9 (2.1)	252.5 (2.3)
50	281.6 (1.4)	282.0 (1.3)	284.1 (1.2)	285.4 (0.8)	287.0 (2.3)	285.9 (2.1)	287.6 (1.7)	284.1 (2.5)	281.7 (1.6)
75	310.9 (1.2)	310.8 (1.0)	311.9 (1.2)	312.3 (1.0)	312.0 (3.4)	313.2 (2.1)	315.0 (1.6)	313.1 (2.8)	308.6 (1.9)
90	336.1 (2.0)	335.9 (1.4)	335.2 (1.3)	335.3 (1.2)	333.4 (2.1)	338.4 (2.3)	338.4 (3.8)	337.5 (3.4)	333.5 (1.9)
95	350.8 (1.7)	350.3 (1.9)	348.3 (1.2)	348.8 (1.6)	345.6 (4.2)	351.9 (1.6)	351.2 (2.9)	351.6 (1.9)	348.4 (2.4)
Female Students									
Mean	291.3 (1.3)	291.2 (1.0)	289.2 (1.2)	294.0 (0.9)	293.8 (1.5)	296.5 (1.2)	295.7 (1.1)	294.7 (1.5)	294.4 (1.2)
Standard Deviation	44.5 (0.6)	42.2 (0.8)	40.5 (0.7)	39.0 (0.4)	36.3 (0.9)	38.8 (0.8)	41.4 (0.9)	42.7 (1.0)	40.6 (0.9)
Percentiles									
5	215.0 (1.9)	218.9 (2.7)	219.4 (2.1)	227.4 (1.9)	231.7 (3.3)	232.3 (3.8)	223.8 (4.5)	223.0 (3.1)	227.1 (3.5)
10	233.3 (1.6)	236.8 (2.0)	236.8 (1.6)	242.9 (1.2)	246.5 (4.8)	247.0 (2.1)	241.8 (1.9)	240.3 (2.8)	242.2 (2.2)
25	262.7 (1.7)	264.9 (1.4)	262.9 (1.8)	268.6 (1.3)	270.2 (2.1)	270.5 (2.3)	270.1 (1.8)	267.3 (1.6)	267.5 (1.7)
50	293.6 (1.2)	293.4 (0.9)	290.7 (1.1)	295.2 (1.0)	294.6 (2.2)	296.6 (1.2)	298.5 (1.6)	296.4 (2.3)	294.7 (2.0)
75	321.7 (1.6)	319.7 (0.7)	317.0 (1.6)	320.9 (0.9)	319.4 (1.5)	323.5 (1.5)	323.8 (1.5)	324.1 (2.6)	322.9 (1.7)
90	346.2 (1.6)	343.3 (1.0)	339.7 (1.7)	343.1 (1.0)	339.8 (1.7)	346.3 (2.5)	346.6 (2.4)	347.9 (3.1)	346.3 (3.3)
95	360.7 (1.2)	357.0 (1.3)	353.2 (1.8)	355.5 (1.2)	351.7 (2.8)	359.4 (2.7)	359.6 (2.7)	362.6 (2.4)	360.0 (4.9)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table C.18
(continued)

NAEP 1996 Long-Term Trend Reading Results — Age 17

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD naep

	1971	1975	1980	1984	1988	1990	1992	1994	1996
White Students									
Mean	291.4 (1.0)	293.0 (0.6)	292.8 (0.9)	295.3 (0.9)	294.7 (1.2)	296.6 (1.2)	297.4 (1.4)	295.7 (1.5)	294.4 (1.2)
Standard Deviation	42.5 (0.4)	39.8 (0.4)	37.9 (0.4)	38.2 (0.3)	36.0 (0.8)	39.6 (0.6)	39.8 (0.6)	41.9 (1.1)	40.5 (0.7)
Percentiles									
5	219.4 (1.4)	225.9 (1.2)	228.5 (1.4)	229.9 (1.4)	232.6 (1.1)	228.5 (2.5)	228.1 (3.2)	221.6 (3.9)	224.6 (2.0)
10	236.6 (1.0)	241.7 (0.9)	243.5 (1.5)	245.6 (0.9)	247.3 (3.7)	246.2 (2.5)	244.9 (2.8)	240.5 (3.8)	242.1 (2.6)
25	263.9 (1.4)	267.0 (0.9)	267.7 (1.0)	270.7 (1.1)	271.4 (1.7)	271.1 (1.4)	272.3 (1.9)	269.6 (3.0)	268.9 (2.5)
50	292.9 (1.2)	294.0 (0.8)	293.6 (0.8)	296.7 (1.1)	295.4 (1.6)	297.5 (1.2)	300.1 (1.9)	297.6 (1.5)	295.6 (1.5)
75	320.1 (1.1)	319.9 (0.7)	318.8 (1.0)	321.6 (0.8)	319.9 (1.9)	323.8 (1.9)	324.5 (1.2)	324.4 (1.5)	322.3 (1.5)
90	344.5 (1.0)	343.2 (0.7)	340.6 (1.3)	343.2 (0.8)	339.7 (1.6)	347.1 (1.6)	346.6 (2.5)	347.1 (2.5)	345.9 (2.4)
95	358.9 (1.4)	357.0 (1.2)	353.5 (1.4)	355.8 (0.9)	351.6 (3.0)	359.7 (1.7)	359.0 (2.5)	361.1 (2.7)	358.4 (3.4)
Black Students									
Mean	238.7 (1.7)	240.6 (2.0)	243.1 (1.8)	263.6 (1.2)	274.4 (2.4)	267.3 (2.3)	260.6 (2.1)	266.2 (3.9)	265.4 (2.7)
Standard Deviation	43.5 (0.7)	43.8 (1.2)	39.5 (1.2)	37.0 (0.8)	35.9 (1.3)	39.2 (2.2)	42.2 (1.7)	42.8 (1.3)	38.6 (1.9)
Percentiles									
5	164.7 (4.4)	164.7 (3.1)	176.0 (2.4)	201.9 (4.1)	214.4 (9.6)	201.3 (7.9)	187.9 (3.3)	192.3 (8.7)	199.8 (4.6)
10	182.1 (4.2)	182.4 (5.3)	191.1 (3.6)	216.0 (2.0)	227.8 (4.3)	217.4 (4.0)	206.2 (6.7)	210.1 (7.7)	216.5 (7.8)
25	210.4 (2.4)	212.1 (3.0)	217.0 (2.7)	239.0 (1.4)	250.5 (2.5)	242.4 (3.9)	235.1 (4.1)	238.9 (4.8)	240.9 (5.7)
50	239.3 (1.6)	242.1 (1.6)	243.9 (2.6)	264.2 (1.2)	274.3 (3.6)	268.4 (1.9)	262.5 (1.6)	267.8 (2.9)	265.5 (3.4)
75	268.1 (2.0)	271.6 (1.4)	270.1 (2.0)	288.3 (1.6)	299.6 (3.1)	293.7 (2.7)	288.3 (1.9)	295.8 (5.6)	290.4 (5.5)
90	294.1 (2.4)	295.7 (1.4)	293.3 (1.7)	310.5 (1.9)	321.0 (4.0)	316.2 (4.8)	312.0 (4.2)	317.5 (7.0)	314.4 (3.8)
95	309.7 (2.2)	308.3 (2.7)	306.6 (2.4)	323.6 (3.4)	333.1 (4.9)	330.5 (11.0)	327.8 (5.4)	334.5 (4.0)	329.5 (5.9)
Hispanic Students									
Mean	0.0 (0.0)	252.4 (3.6)	261.4 (2.7)	268.1 (2.9)	270.8 (4.3)	274.8 (3.6)	271.2 (3.7)	263.2 (4.9)	264.7 (4.1)
Standard Deviation	0.0 (0.0)	42.0 (2.2)	40.1 (1.4)	39.7 (1.5)	37.7 (2.0)	40.7 (2.7)	43.7 (1.8)	44.5 (2.9)	40.4 (2.5)
Percentiles									
5	0.0 (0.0)	184.4 (3.7)	194.3 (7.8)	201.5 (2.4)	204.2 (11.7)	205.9 (11.1)	192.8 (7.2)	186.9 (18.5)	197.5 (6.4)
10	0.0 (0.0)	197.1 (4.9)	208.2 (3.7)	216.6 (2.9)	218.0 (7.4)	224.3 (12.0)	213.1 (9.7)	203.2 (7.9)	211.7 (7.3)
25	0.0 (0.0)	225.4 (5.9)	235.3 (5.0)	241.5 (2.6)	246.4 (5.9)	250.4 (8.3)	240.7 (8.7)	235.6 (6.4)	237.2 (5.0)
50	0.0 (0.0)	252.8 (3.7)	262.6 (3.5)	268.6 (3.1)	273.6 (5.1)	276.3 (3.2)	275.0 (4.7)	264.3 (6.0)	264.2 (5.6)
75	0.0 (0.0)	279.4 (3.0)	288.6 (3.2)	295.4 (3.9)	297.9 (7.1)	302.6 (4.9)	303.3 (6.5)	294.0 (8.2)	293.0 (5.1)
90	0.0 (0.0)	306.7 (6.1)	312.6 (3.0)	318.3 (6.1)	315.9 (18.1)	326.5 (3.2)	326.5 (4.2)	318.2 (5.9)	317.0 (6.6)
95	0.0 (0.0)	320.8 (6.8)	325.1 (3.4)	332.3 (7.7)	328.0 (8.6)	339.4 (11.2)	336.6 (4.6)	331.3 (5.9)	329.4 (5.0)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Data Appendix D

Writing

Table D.1

NAEP 1996 Writing Long-Term Trend Assessment — Grade 4
Percentages of students with Writing scale scores at or above 150

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	92.6 (1.3)	90.5 (0.8)	88.8 (1.1)	92.7 (0.5)	91.8 (0.9)	92.9 (0.7)				+
Gender										
Male	91.6 (1.8)	87.9 (1.2)	85.9 (1.7)	89.8 (0.9)	88.5 (1.2)	90.8 (0.9)				+
Female	93.8 (1.8)	93.1 (1.1)	91.9 (1.2)	95.7 (0.8)	95.1 (1.0)	95.0 (0.8)				
Race/Ethnicity										
White	96.1 (1.1)	95.4 (1.1)	94.0 (0.9)	96.9 (0.3)	96.4 (0.7)	97.1 (0.6)				
Black	81.3 (3.1)	72.9 (4.4)	70.5 (4.8)	76.8 (2.9)	74.7 (2.7)	79.7 (2.9)				
Hispanic	84.3 (6.3)	83.3 (3.2)	81.2 (2.7)	87.0 (3.2)	85.7 (2.4)	85.6 (2.3)				
Other	96.4 (2.4)	92.4 (2.6)	89.1 (7.1)	94.0 (2.9)	94.1 (1.9)	93.9 (3.0)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	96.2 (0.5)	92.4 (0.9)	90.3 (1.7)	94.8 (0.5)	93.4 (0.7)	93.2 (0.8)	–			+
Above Modal Age	86.4 (3.4)	87.3 (1.6)	86.6 (1.4)	90.2 (1.1)	89.5 (2.2)	92.4 (1.2)				
Region										
Northeast	96.8 (1.6)	89.2 (2.3)	92.6 (2.4)	95.6 (1.1)	93.4 (2.0)	95.2 (1.5)				
Southeast	91.9 (1.3)	87.8 (2.2)	82.8 (3.0)	85.9 (1.5)	88.5 (1.7)	89.4 (2.0)				+
Central	92.9 (1.7)	94.5 (2.0)	90.7 (1.6)	95.4 (1.3)	93.4 (1.8)	94.8 (1.6)				
West	90.0 (3.9)	90.7 (1.6)	89.4 (1.6)	93.6 (1.0)	92.0 (1.7)	92.4 (1.4)				
Parents' Education Level										
Less than H. S.	78.5 (6.6)	86.4 (6.0)	80.9 (4.5)	85.0 (2.5)	83.7 (5.3)	85.5 (4.3)				
Graduated H. S.	88.9 (3.2)	88.0 (1.9)	86.9 (1.9)	91.3 (1.5)	92.1 (1.8)	92.1 (1.2)				
Some Education After H. S.	96.9 (1.7)	93.3 (3.7)	92.8 (4.6)	92.4 (2.3)	95.2 (1.9)	93.1 (3.1)				
Graduated College	96.5 (1.3)	92.4 (1.2)	91.9 (1.0)	94.6 (0.9)	94.2 (1.0)	94.9 (0.6)				+
Unknown	94.0 (1.2)	89.6 (1.3)	87.0 (2.2)	92.4 (1.0)	89.0 (2.0)	91.9 (1.6)				
Type of School										
Public	92.0 (1.3)	89.8 (1.0)	88.1 (1.2)	92.0 (0.6)	91.4 (1.1)	92.2 (0.8)				+
Non-Public	96.5 (1.7)	95.3 (1.7)	96.4 (2.1)	98.0 (1.0)	95.4 (1.6)	97.5 (1.1)				
Quartiles										
Upper	100.0(****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	98.7 (0.5)	97.2 (0.6)	96.9 (0.8)	98.8 (0.3)	98.6 (0.4)	98.3 (0.6)				
Lower	72.9 (4.5)	67.6 (2.5)	61.7 (3.6)	73.1 (1.8)	69.8 (3.2)	72.2 (2.7)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table D.2

NAEP 1996 Writing Long-Term Trend Assessment — Grade 4
Percentages of students with Writing scale scores at or above 200

THE NATION'S REPORT CARD

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	54.4 (2.0)	56.1 (2.0)	52.7 (1.7)	58.4 (1.9)	56.3 (2.0)	58.7 (1.5)				
Gender										
Male	50.1 (4.1)	49.5 (2.6)	46.3 (2.2)	49.6 (2.0)	47.2 (2.5)	50.9 (3.0)				
Female	59.4 (3.0)	62.9 (2.7)	59.4 (2.7)	67.4 (2.4)	65.5 (2.4)	66.4 (2.3)				
Race/Ethnicity										
White	62.2 (2.1)	65.2 (2.0)	61.8 (2.3)	69.1 (2.3)	66.8 (2.0)	68.5 (1.7)			+	
Black	29.3 (6.9)	24.7 (4.4)	24.0 (5.0)	23.6 (3.4)	21.5 (3.9)	30.3 (2.6)				
Hispanic	37.2 (5.8)	40.6 (4.3)	34.3 (4.8)	37.6 (4.1)	37.6 (4.2)	40.5 (4.7)				
Other	58.3(10.1)	61.4 (4.8)	52.2 (7.1)	57.7 (3.8)	61.6 (4.8)	56.8 (7.2)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	62.8 (3.3)	60.4 (2.6)	56.1 (2.6)	63.3 (2.1)	59.9 (2.3)	59.5 (1.9)				
Above Modal Age	40.0 (4.7)	49.1 (2.5)	47.4 (2.1)	52.4 (2.3)	51.5 (2.9)	57.3 (2.8)	+		+	
Region										
Northeast	64.2 (4.7)	54.3 (4.4)	62.4 (4.0)	67.1 (4.2)	60.9 (4.5)	65.6 (3.3)				
Southeast	54.8 (4.6)	51.2 (3.9)	44.1 (3.9)	43.7 (2.9)	49.4 (4.3)	50.1 (4.2)				
Central	50.0 (3.4)	61.1 (3.7)	54.2 (3.2)	66.3 (3.2)	61.5 (4.6)	64.0 (3.5)	+		+	
West	51.5 (6.1)	58.3 (3.8)	51.1 (3.3)	56.7 (2.8)	54.3 (3.3)	55.7 (3.0)				
Parents' Education Level										
Less than H. S.	29.1 (9.9)	43.7 (6.5)	36.8 (3.5)	41.2 (5.0)	38.0 (8.6)	42.0 (6.5)				
Graduated H. S.	41.4 (4.0)	50.1 (4.0)	48.3 (4.1)	53.7 (4.1)	53.3 (3.2)	54.8 (3.8)			+	
Some Education After H. S.	60.7 (9.7)	63.3 (7.2)	63.1 (5.1)	52.4 (4.8)	64.9 (5.4)	55.7 (5.3)				
Graduated College	69.3 (3.5)	62.7 (1.9)	59.9 (2.2)	65.2 (1.5)	63.9 (2.2)	65.7 (2.4)				
Unknown	53.3 (3.2)	51.9 (3.2)	47.4 (2.3)	55.8 (3.9)	48.7 (2.7)	54.7 (2.5)				
Type of School										
Public	52.4 (2.5)	54.7 (2.2)	51.4 (1.6)	56.3 (2.0)	55.4 (2.4)	56.7 (1.8)				
Non-Public	66.4 (7.3)	66.2 (4.9)	66.6 (5.3)	74.1 (3.9)	63.8 (5.3)	71.0 (3.9)				
Quartiles										
Upper	94.8 (1.6)	95.1 (1.5)	92.9 (1.5)	96.8 (0.9)	95.2 (1.5)	94.8 (1.6)				
Middle two	56.7 (2.5)	59.6 (2.8)	54.6 (1.9)	62.9 (3.0)	59.6 (2.3)	59.4 (1.9)				
Lower	9.0 (2.1)	10.3 (2.2)	8.6 (2.6)	11.0 (1.3)	10.2 (2.3)	11.0 (2.2)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.3

NAEP 1996 Writing Long-Term Trend Assessment — Grade 4

Percentages of students with Writing scale scores at or above 250

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	10.1 (1.0)	14.6 (1.1)	12.2 (0.9)	13.0 (1.1)	11.7 (0.8)	13.0 (1.2)				
Gender										
Male	8.6 (1.3)	10.9 (1.3)	8.9 (0.9)	8.1 (1.1)	7.1 (1.1)	9.2 (1.2)				
Female	11.9 (2.6)	18.5 (1.4)	15.6 (1.4)	17.9 (1.4)	16.3 (1.4)	16.8 (1.9)				
Race/Ethnicity										
White	12.5 (1.1)	18.5 (1.5)	15.5 (1.3)	16.9 (1.5)	15.1 (1.0)	16.9 (1.7)				
Black	2.5(****)	2.5 (1.1)	2.5 (1.5)	1.0(****)	1.5 (0.7)	3.0 (1.2)				
Hispanic	4.7 (2.3)	6.5 (1.5)	4.6 (1.3)	4.3 (1.2)	3.9 (1.6)	5.3 (1.0)				
Other	10.9 (5.2)	16.4 (5.0)	12.0 (3.8)	11.5 (3.0)	13.5 (4.0)	9.5 (2.7)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	12.8 (2.0)	16.4 (1.6)	13.6 (1.5)	15.4 (1.3)	12.8 (1.2)	13.6 (1.1)				
Above Modal Age	- 5.5 (1.7)	11.5 (1.1)	9.9 (1.2)	10.0 (1.5)	10.1 (1.5)	12.1 (1.9)	+			
Region										
Northeast	12.4 (3.9)	15.0 (2.8)	16.7 (1.9)	18.9 (3.0)	14.6 (1.9)	15.9 (2.1)				
Southeast	9.7 (3.3)	11.9 (1.5)	9.3 (1.4)	7.2 (1.2)	9.4 (1.5)	10.3 (2.0)				
Central	8.3 (2.0)	17.1 (2.1)	11.1 (2.3)	16.0 (2.4)	13.8 (2.2)	14.7 (2.8)				
West	10.7 (2.9)	14.9 (2.7)	12.0 (1.3)	10.6 (1.4)	9.7 (1.5)	11.6 (1.9)				
Parents' Education Level										
Less than H. S.	1.2(****)	8.1 (4.4)	5.3 (2.8)	5.6 (3.2)	5.7 (2.9)	6.3 (4.0)				
Graduated H. S.	4.2 (2.4)	11.3 (1.9)	8.4 (2.5)	9.7 (2.3)	9.2 (2.2)	9.6 (1.7)				
Some Education After H. S.	9.7(****)	16.9 (6.1)	21.7 (3.5)	8.0 (2.8)	14.8 (4.9)	10.2 (4.5)				
Graduated College	19.2 (2.7)	18.7 (1.8)	15.8 (1.1)	17.3 (1.1)	15.8 (1.8)	17.0 (1.9)				
Unknown	7.1 (1.8)	11.8 (1.9)	9.6 (1.2)	11.1 (1.8)	7.8 (1.1)	10.9 (1.2)				
Type of School										
Public	9.2 (1.1)	13.9 (1.2)	11.6 (0.8)	12.0 (1.2)	11.4 (0.9)	12.3 (1.3)				
Non-Public	16.0 (3.9)	19.8 (3.8)	18.0 (4.7)	20.5 (2.8)	14.7 (3.6)	17.7 (2.7)				
Quartiles										
Upper	34.5 (3.7)	44.5 (2.4)	38.2 (2.7)	41.9 (2.1)	37.5 (2.0)	36.7 (2.5)				
Middle two	3.0 (1.0)	7.0 (1.2)	5.1 (0.6)	5.0 (1.3)	4.4 (0.9)	5.0 (1.1)				
Lower	0.0(****)	0.1(****)	0.2(****)	0.0(****)	0.1(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (-) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (-) than that in 1994.

L Indicates that the positive (+) or negative (-) linear trend is significant.

Q Indicates that the positive (+) or negative (-) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.4

NAEP 1996 Writing Long-Term Trend Assessment — Grade 4
Percentages of students with Writing scale scores at or above 300

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	0.5(****)	0.8 (0.2)	0.5 (0.1)	0.5 (0.2)	0.4 (0.2)	0.5 (0.2)				
Gender										
Male	0.4(****)	0.4 (0.2)	0.3 (0.1)	0.2 (0.1)	0.1(****)	0.2(****)				
Female	0.5 (0.3)	1.2 (0.4)	0.8 (0.2)	0.8 (0.3)	0.6 (0.3)	0.7 (0.3)				
Race/Ethnicity										
White	0.5(****)	1.1 (0.3)	0.7 (0.2)	0.6 (0.2)	0.5 (0.2)	0.6 (0.3)				
Black	0.0(****)	0.1(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)				
Hispanic	0.5(****)	0.2(****)	0.2(****)	0.0(****)	0.1(****)	0.3(****)				
Other	0.6(****)	0.6(****)	0.2(****)	0.4(****)	0.4(****)	0.7(****)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	0.7(****)	0.9 (0.3)	0.6 (0.1)	0.7 (0.3)	0.5 (0.2)	0.5 (0.3)				
Above Modal Age	0.1(****)	0.6 (0.4)	0.4 (0.2)	0.2(****)	0.2(****)	0.4 (0.2)				
Region										
Northeast	0.4(****)	0.7(****)	0.8 (0.3)	1.1 (0.7)	0.6(****)	0.3(****)				
Southeast	0.6(****)	0.8 (0.3)	0.4(****)	0.1(****)	0.2(****)	0.5 (0.3)				
Central	0.4(****)	0.7 (0.2)	0.4 (0.3)	0.5 (0.2)	0.4(****)	0.5(****)				
West	0.4(****)	0.9 (0.6)	0.5 (0.3)	0.3 (0.2)	0.3(****)	0.5(****)				
Parents' Education Level										
Less than H. S.	0.0(****)	0.6(****)	0.3(****)	0.1(****)	0.3(****)	0.2(****)				
Graduated H. S.	0.0(****)	0.4(****)	0.4(****)	0.2(****)	0.2(****)	0.2(****)				
Some Education After H. S.	0.0(****)	2.4(****)	1.3(****)	0.3(****)	0.3(****)	0.7(****)				
Graduated College	1.2(****)	1.1 (0.3)	0.8 (0.2)	0.8 (0.3)	0.6 (0.3)	0.7 (0.3)				
Unknown	0.2(****)	0.4(****)	0.2(****)	0.2(****)	0.1(****)	0.3 (0.2)				
Type of School										
Public	0.3(****)	0.8 (0.2)	0.5 (0.1)	0.5 (0.1)	0.3 (0.1)	0.4 (0.2)				
Non-Public	1.3(****)	1.0(****)	0.4(****)	0.6(****)	0.8(****)	0.8 (0.5)				
Quartiles										
Upper	1.8(****)	3.0 (0.7)	2.0 (0.5)	1.9 (0.7)	1.4 (0.6)	1.6 (0.7)				
Middle two	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.5

NAEP 1996 Writing Long-Term Trend Assessment — Grade 4
Percentages of students with Writing scale scores at or above 350

	1984	1988	1990	1992	1994	1996	* ‡ L Q
TOTAL	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Gender							
Male	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Female	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Race/Ethnicity							
White	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Black	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Hispanic	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Other	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Modal Age							
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	
At Modal Age	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Above Modal Age	- 0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Region							
Northeast	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	
Southeast	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Central	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
West	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Parents' Education Level							
Less than H. S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Graduated H. S.	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Some Education After H. S.	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Graduated College	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Unknown	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Type of School							
Public	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Non-Public	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Quartiles							
Upper	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)	0.0(****)	
Middle two	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.6

NAEP 1996 Writing Long-Term Trend Assessment — Grade 8
Percentages of students with Writing scale scores at or above 150

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	100.0(****)	99.9(****)	99.8 (0.1)	99.9(****)	99.9(****)	99.8 (0.1)				
Gender										
Male	100.0(****)	99.9(****)	99.6 (0.2)	99.9(****)	99.9(****)	99.7 (0.2)				
Female	100.0(****)	100.0(****)	99.9 (0.1)	100.0(****)	100.0(****)	100.0(****)				
Race/Ethnicity										
White	100.0(****)	100.0(****)	99.9 (0.1)	100.0(****)	100.0(****)	100.0(****)				
Black	100.0(****)	99.9(****)	99.3 (0.5)	99.7(****)	99.8(****)	99.6(****)				
Hispanic	100.0(****)	99.8(****)	99.6(****)	99.9(****)	99.7(****)	99.5(****)				
Other	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	99.8(****)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	100.0(****)	100.0(****)	99.9 (0.1)	100.0(****)	100.0(****)	100.0(****)				
Above Modal Age	100.0(****)	99.9(****)	99.7 (0.2)	99.9(****)	99.9(****)	99.7(****)				
Region										
Northeast	100.0(****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	99.9(****)				
Southeast	100.0(****)	99.9(****)	99.6(****)	99.9(****)	99.9(****)	99.8(****)				
Central	100.0(****)	100.0(****)	99.9(****)	100.0(****)	99.9(****)	99.8(****)				
West	100.0(****)	99.9(****)	99.7(****)	99.9(****)	99.9(****)	99.9 (0.1)				
Parents' Education Level										
Less than H. S.	100.0(****)	100.0(****)	99.5(****)	99.8(****)	99.8(****)	99.6 (0.3)				
Graduated H. S.	100.0(****)	99.9(****)	99.7(****)	100.0(****)	100.0(****)	99.9(****)				
Some Education after H. S.	100.0(****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	99.9(****)				
Graduated College	100.0(****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	99.9(****)				
Unknown	100.0(****)	99.7(****)	99.4(****)	99.6(****)	99.4(****)	99.4(****)				
Type of School										
Public	100.0(****)	99.9(****)	99.7 (0.1)	99.9(****)	99.9(****)	99.8 (0.1)				
Non-public	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)				
Quartiles										
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Graduated college	100.0(****)	99.8(****)	99.1 (0.3)	99.8(****)	99.7(****)	99.4 (0.4)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.7

NAEP 1996 Writing Long-Term Trend Assessment — Grade 8

Percentages of students with Writing scale scores at or above 200

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	[illegible]	97.2 (0.6)	93.2 (0.6)	97.7 (0.4)	95.9 (0.6)	95.6 (0.5)				
Gender										
Male	97.2 (1.2)	95.4 (1.0)	89.6 (1.0)	96.3 (0.7)	93.4 (1.1)	92.7 (0.9)	–		–	
Female	99.5(****)	98.9 (0.3)	97.0 (0.7)	99.1 (0.5)	98.7 (0.4)	98.5 (0.4)				
Race/Ethnicity										
White	99.3 (0.4)	98.5 (0.3)	95.6 (0.6)	98.6 (0.4)	97.8 (0.5)	97.8 (0.4)	–			+
Black	95.2 (3.4)	92.2 (2.2)	85.5 (2.4)	94.7 (2.2)	90.1 (2.6)	88.9 (1.9)				
Hispanic	92.9(****)	94.8 (1.9)	89.3 (2.2)	96.4 (2.3)	92.1 (2.0)	90.9 (1.8)				
Other	99.7(****)	98.7 (0.9)	92.3 (1.7)	98.6(****)	96.4 (1.5)	96.5 (1.1)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	99.2 (0.5)	98.6 (0.3)	95.6 (0.5)	98.7 (0.4)	97.7 (0.4)	97.2 (0.6)	–		–	
Above Modal Age	96.9 (1.6)	95.1 (1.3)	89.7 (1.3)	96.4 (0.9)	93.6 (1.3)	93.6 (0.9)				
Region										
Northeast	99.2(****)	97.9 (0.7)	95.2 (1.5)	98.7 (0.6)	98.4 (0.6)	95.1 (1.3)				
Southeast	97.9(****)	97.3 (1.4)	90.5 (1.6)	96.8 (1.1)	95.0 (1.2)	94.6 (1.4)				
Central	98.8 (0.6)	95.8 (1.0)	94.6 (1.8)	98.5 (0.6)	96.3 (1.7)	96.5 (1.3)				
West	97.4 (1.8)	97.6 (0.7)	93.1 (0.7)	97.3 (1.0)	94.6 (0.9)	96.0 (1.0)				
Parents' Education Level										
Less than H. S.	96.3(****)	95.1 (2.5)	90.8 (2.7)	95.9 (2.8)	91.0 (2.0)	91.3 (2.3)				
Graduated H. S.	98.4 (1.0)	96.1 (1.0)	93.2 (1.0)	97.7 (0.6)	95.0 (1.4)	95.0 (1.2)				
Some Education after H. S.	98.8(****)	98.8 (0.8)	95.9 (1.1)	98.6(****)	97.7 (1.1)	97.4 (1.3)				
Graduated College	99.6(****)	98.6 (0.5)	95.7 (1.1)	98.9 (0.5)	98.4 (0.5)	98.0 (0.6)				
Unknown	94.4 (3.1)	94.0 (1.7)	83.3 (2.7)	92.1 (2.0)	87.7 (2.8)	86.6 (2.0)				
Type of School										
Public	98.1 (1.0)	96.9 (0.6)	92.6 (0.7)	97.6 (0.5)	95.6 (0.7)	95.3 (0.6)	–			
Non-public	99.8(****)	99.3 (0.3)	97.9 (0.9)	98.9(****)	98.9(****)	97.8 (1.1)				
Quartiles										
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(****)	99.8(****)	98.7 (0.3)	99.9(****)	99.7 (0.2)	99.7 (0.2)	+			
Graduated college	93.3 (3.4)	89.0 (2.3)	75.8 (2.1)	91.1 (1.8)	84.4 (2.3)	84.4 (1.5)	–			

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.8

NAEP 1996 Writing Long-Term Trend Assessment — Grade 8
Percentages of students with Writing scale scores at or above 250

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	72.4 (2.6)	67.1 (1.7)	57.0 (1.5)	75.0 (1.4)	67.2 (1.3)	65.6 (1.3)	–			+
Gender										
Male	61.2 (3.7)	55.5 (2.1)	45.0 (2.2)	65.7 (2.5)	55.7 (2.3)	52.4 (1.6)				
Female	83.9 (2.6)	78.4 (2.2)	69.3 (1.6)	84.0 (1.6)	79.8 (1.6)	79.0 (1.8)				+
Race/Ethnicity										
White	78.9 (2.6)	73.5 (1.6)	63.0 (1.8)	79.7 (1.5)	74.8 (1.5)	74.1 (1.4)				+
Black	47.5 (9.2)	45.3 (5.0)	37.4 (2.7)	58.3 (4.3)	43.3 (4.1)	41.8 (3.9)				
Hispanic	46.6 (8.7)	52.3 (4.1)	45.3 (4.0)	67.4 (3.7)	52.0 (3.9)	46.2 (2.7)				
Other	78.9 (5.3)	73.1 (4.5)	55.5 (4.2)	75.4 (5.9)	66.7 (5.0)	64.4 (4.0)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	79.2 (2.5)	75.1 (1.8)	63.0 (1.6)	82.0 (1.5)	74.9 (1.3)	71.6 (1.9)	–			
Above Modal Age	60.9 (4.4)	55.4 (2.2)	47.4 (2.2)	64.7 (1.8)	56.7 (3.0)	57.8 (3.1)				
Region										
Northeast	80.2 (5.4)	68.5 (3.9)	62.2 (2.9)	83.3 (2.6)	78.9 (2.1)	65.8 (3.4)		–		
Southeast	72.2 (4.5)	71.7 (2.4)	52.2 (3.1)	67.5 (3.1)	60.4 (2.3)	62.2 (3.8)				
Central	69.9 (3.1)	60.6 (3.3)	59.8 (4.1)	78.4 (2.2)	71.5 (4.6)	71.7 (2.7)				
West	68.1 (4.0)	68.0 (2.8)	54.8 (3.4)	72.3 (2.8)	60.7 (1.7)	63.7 (1.6)				
Parents' Education Level										
Less than H. S.	61.8 (6.6)	56.4 (5.2)	45.1 (3.7)	59.8 (6.5)	52.0 (6.4)	43.4 (7.3)				
Graduated H. S.	66.3 (3.1)	60.2 (3.0)	52.6 (2.2)	69.7 (2.7)	59.5 (2.7)	60.5 (2.3)				
Some Education after H. S.	79.4 (5.3)	79.4 (3.1)	67.9 (3.8)	81.0 (2.9)	73.4 (3.3)	72.0 (2.2)				
Graduated College	84.9 (1.9)	74.9 (2.1)	66.0 (2.7)	83.8 (1.9)	77.5 (1.2)	76.1 (1.8)	–			+
Unknown	49.4(10.2)	49.6 (4.3)	33.5 (4.6)	49.2 (3.6)	39.0 (3.3)	39.5 (3.2)				
Type of School										
Public	70.1 (2.8)	65.3 (1.9)	54.0 (1.4)	73.3 (1.4)	65.5 (1.5)	64.7 (1.4)				+
Non-public	87.2 (3.8)	80.4 (3.1)	77.0 (4.7)	86.2 (2.5)	81.2 (3.0)	74.0 (3.9)	–			
Quartiles										
Upper	99.6(****)	97.9 (0.6)	95.1 (0.8)	99.5 (0.2)	98.6 (0.7)	98.4 (0.6)				
Middle two	84.4 (3.9)	74.6 (1.9)	60.3 (1.8)	84.3 (1.4)	75.7 (2.1)	75.8 (1.2)				+
Graduated college	21.6 (3.6)	21.2 (2.6)	12.5 (1.8)	31.6 (2.5)	19.1 (1.8)	18.4 (1.6)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table D.9

NAEP 1996 Writing Long-Term Trend Assessment — Grade 8

Percentages of students with Writing scale scores at or above 300

THE NATION'S REPORT CARD

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	13.0 (1.8)	13.2 (0.8)	12.1 (0.8)	24.7 (1.5)	16.6 (1.2)	16.1 (0.8)			+	
Gender										
Male	6.7 (1.5)	6.4 (1.1)	6.6 (1.0)	15.3 (1.6)	8.7 (1.1)	7.7 (0.8)				
Female	19.5 (3.6)	19.7 (1.3)	17.8 (1.3)	33.9 (1.9)	25.3 (1.7)	24.6 (1.3)			+	
Race/Ethnicity										
White	15.5 (2.2)	16.1 (1.1)	14.6 (0.9)	28.4 (1.9)	20.6 (1.5)	20.4 (1.0)			+	
Black	2.6 (1.7)	3.8 (1.1)	4.0 (1.1)	13.4 (2.3)	4.9 (1.6)	4.2 (1.0)				
Hispanic	4.1 (2.3)	5.5 (1.5)	7.3 (1.5)	15.8 (2.4)	8.8 (2.5)	6.1 (1.6)				
Other	16.3 (6.7)	15.5 (3.7)	12.6 (2.8)	25.9 (4.8)	13.8 (2.8)	13.8 (3.3)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	16.2 (1.8)	17.2 (1.2)	14.3 (1.1)	31.3 (1.6)	21.0 (1.6)	19.4 (1.0)			+	
Above Modal Age	7.6 (2.8)	7.2 (1.0)	8.2 (1.1)	14.9 (2.0)	10.7 (1.4)	11.8 (1.2)				
Region										
Northeast	18.8 (4.8)	12.9 (1.4)	14.0 (1.6)	34.4 (3.8)	24.1 (3.6)	16.3 (2.5)				
Southeast	13.6 (3.0)	17.2 (2.1)	10.3 (1.5)	18.2 (2.6)	11.5 (1.4)	14.1 (2.1)				
Central	9.6 (2.3)	10.2 (1.4)	13.1 (2.4)	26.4 (2.5)	20.0 (2.3)	18.6 (1.8)	+		+	
West	10.8 (2.9)	12.6 (1.8)	11.5 (1.9)	21.8 (2.6)	12.7 (1.7)	15.7 (1.3)				
Parents' Education Level										
Less than H. S.	7.9 (2.8)	6.8 (1.7)	5.4 (1.8)	10.1 (4.2)	6.5 (3.0)	5.0 (2.8)				
Graduated H. S.	7.2 (1.3)	8.5 (1.2)	8.7 (1.1)	18.8 (1.9)	11.9 (1.5)	10.3 (1.8)			+	
Some Education after H. S.	13.6 (4.0)	21.6 (3.1)	18.1 (3.1)	26.9 (3.2)	18.6 (3.6)	18.8 (2.5)				
Graduated College	21.6 (3.3)	17.4 (1.9)	16.7 (1.3)	33.4 (2.2)	22.8 (1.8)	22.9 (1.8)				
Unknown	4.5 (2.1)	4.9 (1.9)	4.2 (1.2)	7.5 (2.6)	3.9 (1.4)	5.3 (1.9)				
Type of School										
Public	10.8 (2.1)	12.0 (1.0)	10.0 (0.9)	22.8 (1.9)	15.4 (1.3)	15.4 (0.8)			+	
Non-public	27.2 (7.6)	21.7 (4.1)	26.6 (3.7)	37.2 (3.7)	26.4 (5.1)	21.6 (3.7)				
Quartiles										
Upper	43.7 (3.9)	42.4 (2.3)	40.0 (1.4)	65.9 (2.2)	50.5 (3.1)	52.4 (2.5)			+	
Middle two	4.1 (1.7)	5.1 (0.8)	4.3 (0.8)	16.1 (1.9)	7.9 (1.3)	7.3 (0.8)			+	
Graduated college	0.0(****)	0.1(****)	0.1(****)	0.8(****)	0.2(****)	0.1(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

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L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.10

NAEP 1996 Writing Long-Term Trend Assessment — Grade 8
Percentages of students with Writing scale scores at or above 350

THE NATION'S REPORT CARD

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	0.1(****)	0.2 (0.1)	0.6 (0.2)	1.6 (0.3)	0.6 (0.2)	0.5 (0.2)				–
Gender										
Male	0.0(****)	0.1(****)	0.2(****)	0.5 (0.2)	0.1(****)	0.1(****)				
Female	0.2(****)	0.4 (0.2)	1.1 (0.3)	2.7 (0.6)	1.1 (0.4)	1.0 (0.3)				–
Race/Ethnicity										
White	0.1(****)	0.3 (0.2)	0.8 (0.2)	1.9 (0.4)	0.8 (0.3)	0.7 (0.2)				–
Black	0.0(****)	0.0(****)	0.1(****)	0.6(****)	0.1(****)	0.2(****)				
Hispanic	0.0(****)	0.0(****)	0.1(****)	0.9(****)	0.2(****)	0.2(****)				
Other	0.0(****)	0.5(****)	0.7(****)	1.8 (1.2)	0.3(****)	0.3(****)				
Modal Age										
Below Modal Age	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)	*****(****)				
At Modal Age	0.1(****)	0.3 (0.2)	0.8 (0.2)	2.2 (0.5)	0.9 (0.3)	0.7 (0.2)				–
Above Modal Age	0.0(****)	0.1(****)	0.3 (0.2)	0.7 (0.4)	0.2 (0.1)	0.3 (0.2)				
Region										
Northeast	0.1(****)	0.3(****)	1.0 (0.5)	3.1 (0.7)	1.1 (0.4)	0.5 (0.3)				
Southeast	0.2(****)	0.3(****)	0.5 (0.3)	0.8 (0.4)	0.2 (0.1)	0.7 (0.4)				
Central	0.0(****)	0.1(****)	0.6 (0.4)	1.6 (0.7)	0.8 (0.4)	0.6 (0.3)				
West	0.0(****)	0.2(****)	0.4 (0.3)	1.2 (0.7)	0.4(****)	0.5 (0.3)				
Parents' Education Level										
Less than H. S.	0.0(****)	0.1(****)	0.1(****)	0.2(****)	0.2(****)	0.3(****)				
Graduated H. S.	0.0(****)	0.0(****)	0.3(****)	0.6 (0.3)	0.3(****)	0.3(****)				
Some Education after H. S.	0.1(****)	0.4(****)	1.2 (0.6)	2.1 (0.9)	0.4(****)	1.1(****)				
Graduated College	0.2(****)	0.4 (0.2)	0.9 (0.4)	2.7 (0.7)	1.0 (0.3)	0.7 (0.2)				–
Unknown	0.0(****)	0.1(****)	0.2(****)	0.0(****)	0.2(****)	0.1(****)				
Type of School										
Public	0.0(****)	0.2(****)	0.5 (0.2)	1.4 (0.4)	0.5 (0.2)	0.5 (0.1)				
Non-public	0.4(****)	0.6(****)	1.7 (0.7)	3.0 (1.3)	1.2(****)	1.1 (0.7)				
Quartiles										
Upper	0.3(****)	0.9 (0.5)	2.5 (0.6)	6.3 (1.0)	2.4 (0.7)	2.2 (0.7)				–
Middle two	0.0(****)	0.0(****)	0.0(****)	0.1(****)	0.0(****)	0.0(****)				
Graduated college	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table D.11

NAEP 1996 Writing Long-Term Trend Assessment — Grade 11
Percentages of students with Writing scale scores at or above 150

	1984	1988	1990	1992	1994	1996	* ‡ L Q
TOTAL	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Gender							
Male	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	
Female	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Race/Ethnicity							
White	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Black	99.9(****)	100.0(****)	99.9(****)	99.8(****)	100.0(****)	100.0(****)	
Hispanic	100.0(****)	99.9(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Other	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.7(****)	100.0(****)	
Modal Age							
Below Modal Age	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
At Modal Age	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Above Modal Age	100.0(****)	100.0(****)	99.9(****)	99.9(****)	99.9(****)	100.0(****)	
Region							
Northeast	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Southeast	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Central	100.0(****)	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	
West	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	
Parents' Educaton Level							
Less than H. S.	100.0(****)	100.0(****)	99.9(****)	100.0(****)	99.9(****)	100.0(****)	
Graduated H. S.	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Some Education After H. S.	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Graduated College	100.0(****)	100.0(****)	100.0(****)	99.9(****)	100.0(****)	100.0(****)	
Unknown	*****(****)	99.8(****)	100.0(****)	100.0(****)	99.5(****)	100.0(****)	
Type of School							
Public	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Non-public	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Quartiles							
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	
Lower	100.0(****)	100.0(****)	99.9(****)	99.9(****)	99.8(****)	100.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table D.12

NAEP 1996 Writing Long-Term Trend Assessment — Grade 11
Percentages of students with Writing scale scores at or above 200

THE NATION'S REPORT CARD

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	99.5 (0.3)	99.7(****)	99.1 (0.3)	99.5 (0.2)	99.0 (0.2)	99.2 (0.2)				
Gender										
Male	99.2 (0.4)	99.6(****)	98.4 (0.6)	99.2 (0.4)	98.3 (0.4)	98.8 (0.4)				
Female	99.7(****)	99.8(****)	99.8(****)	99.9(****)	99.6(****)	99.7(****)				
Race/Ethnicity										
White	99.9(****)	99.8(****)	99.5 (0.3)	99.8 (0.1)	99.6 (0.2)	99.7 (0.1)				
Black	98.8(****)	99.7(****)	97.8 (0.8)	98.4 (0.8)	97.9 (0.7)	98.2 (0.9)				
Hispanic	96.8 (1.8)	99.0(****)	98.4(****)	98.8(****)	97.3 (1.3)	98.0 (1.0)				
Other	98.8(****)	99.8(****)	98.3(****)	99.3(****)	98.1 (1.0)	99.0(****)				
Modal Age										
Below Modal Age	99.9(****)	100.0(****)	99.6(****)	99.9(****)	99.4(****)	99.8(****)				
At Modal Age	99.9(****)	99.9(****)	99.5 (0.2)	99.8 (0.2)	99.4 (0.2)	99.5 (0.3)				
Above Modal Age	97.8 (0.9)	99.0(****)	97.6 (0.9)	98.7 (0.6)	97.8 (0.8)	98.3 (0.5)				
Region										
Northeast	99.2(****)	99.9(****)	99.5 (0.4)	99.5 (0.3)	99.3 (0.3)	99.7(****)				
Southeast	99.7(****)	99.8(****)	98.5 (0.7)	99.4(****)	98.8 (0.5)	98.3 (0.6)				
Central	99.8(****)	99.5(****)	99.2(****)	99.8(****)	98.9 (0.6)	99.6 (0.2)				
West	99.3 (0.5)	99.9(****)	99.1 (0.6)	99.3(****)	99.1 (0.6)	99.2 (0.5)				
Parents' Educaton Level										
Less than H. S.	99.0(****)	99.3(****)	97.9(****)	99.4(****)	98.4 (1.0)	96.8 (1.7)				
Graduated H. S.	99.4(****)	99.7(****)	98.3 (0.7)	99.4 (0.3)	99.0 (0.7)	99.0 (0.5)				
Some Education After H. S.	99.9(****)	99.8(****)	99.7(****)	99.6 (0.2)	99.5(****)	99.7(****)				
Graduated College	99.9(****)	100.0(****)	99.7(****)	99.8(****)	99.6 (0.3)	99.7 (0.2)				
Unknown	*****(****)	97.9(****)	96.6 (2.4)	95.4(****)	92.8 (3.1)	96.0(****)				
Type of School										
Public	99.4 (0.3)	99.7(****)	99.0 (0.4)	99.5 (0.2)	98.9 (0.3)	99.2 (0.3)				
Non-public	100.0(****)	100.0(****)	99.9(****)	99.7(****)	99.5(****)	99.6(****)				
Quartiles										
Upper	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Middle two	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)	100.0(****)				
Lower	98.0 (1.0)	99.0(****)	96.3 (1.4)	98.0 (0.9)	96.1 (0.9)	97.0 (0.9)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.13

NAEP 1996 Writing Long-Term Trend Assessment — Grade 11
Percentages of students with Writing scale scores at or above 250

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	89.4 (1.0)	92.7 (1.5)	84.3 (1.3)	87.4 (1.3)	84.5 (1.2)	83.0 (1.4)	–		–	
Gender										
Male	84.2 (1.6)	88.8 (2.3)	77.4 (1.9)	82.6 (1.8)	78.9 (1.6)	77.0 (2.0)	–		–	
Female	94.7 (1.1)	96.1 (1.3)	91.4 (1.4)	92.9 (1.2)	89.9 (1.2)	89.6 (1.2)	–		–	
Race/Ethnicity										
White	94.8 (1.3)	95.7 (1.4)	88.6 (1.4)	92.6 (0.8)	89.2 (1.0)	88.2 (1.5)	–		–	
Black	76.4 (5.2)	83.4 (4.0)	69.5 (3.6)	68.3 (5.7)	70.8 (3.6)	69.6 (4.8)				
Hispanic	62.3 (9.2)	81.3 (5.1)	76.8 (3.6)	77.1 (5.5)	74.2 (4.1)	70.0 (3.5)				
Other	90.2 (4.3)	94.4 (2.8)	81.0 (5.2)	88.5 (3.5)	85.8 (3.9)	84.7 (5.1)				
Modal Age										
Below Modal Age	93.0 (1.8)	97.3 (1.0)	91.0 (3.2)	91.3 (2.5)	88.9 (2.5)	90.6 (3.3)				
At Modal Age	93.8 (0.9)	96.7 (0.6)	88.5 (1.6)	92.5 (1.1)	88.7 (1.2)	86.8 (1.0)	–		–	
Above Modal Age	71.8 (3.8)	77.4 (6.4)	70.4 (2.3)	73.5 (3.8)	72.4 (3.1)	71.4 (4.1)				
Region										
Northeast	90.2 (2.5)	94.9 (2.1)	88.9 (1.8)	89.3 (1.9)	89.2 (1.9)	87.7 (2.1)				
Southeast	88.7 (2.9)	92.1 (1.6)	78.7 (2.5)	79.9 (3.4)	79.5 (3.1)	75.0 (3.4)	–		–	
Central	91.0 (2.2)	92.2 (2.6)	85.2 (2.2)	91.0 (1.8)	83.9 (2.1)	85.2 (2.9)				
West	87.3 (2.0)	91.7 (2.2)	84.4 (2.3)	89.0 (1.9)	85.5 (2.4)	83.4 (2.5)				
Parents' Educaton Level										
Less than H. S.	79.6 (4.9)	81.4 (5.4)	69.8 (4.9)	74.7 (5.6)	72.0 (6.1)	62.4 (3.8)	–		–	
Graduated H. S.	86.1 (3.6)	90.6 (2.4)	78.8 (2.6)	82.3 (2.6)	82.1 (1.9)	77.3 (2.1)				
Some Education After H. S.	94.6 (1.9)	95.3 (2.0)	88.7 (1.8)	91.5 (2.1)	86.4 (2.5)	86.8 (2.0)	–		–	
Graduated College	95.6 (1.5)	96.6 (1.6)	91.1 (1.2)	92.7 (1.5)	89.9 (1.2)	89.4 (1.7)	–		–	
Unknown	*****(****)	76.5 (8.1)	60.9 (7.4)	64.4 (7.7)	52.4 (7.0)	59.7 (6.2)				
Type of School										
Public	88.5 (1.1)	92.0 (1.6)	83.4 (1.3)	86.8 (1.4)	83.8 (1.2)	82.7 (1.6)	–		–	
Non-public	97.0 (1.3)	96.7 (2.1)	93.6 (3.2)	93.4 (2.7)	90.0 (3.6)	86.1 (5.0)				
Quartiles										
Upper	99.9(****)	100.0(****)	99.9(****)	99.9(****)	99.9(****)	99.7(****)				
Middle two	98.1 (0.6)	99.3 (0.5)	93.1 (1.1)	96.3 (0.8)	93.7 (0.9)	92.9 (0.7)	–		–	
Lower	61.4 (3.5)	72.0 (5.6)	51.1 (3.3)	57.1 (4.0)	50.9 (3.1)	49.5 (4.1)			–	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.14

NAEP 1996 Writing Long-Term Trend Assessment — Grade 11
Percentages of students with Writing scale scores at or above 300

THE NATION'S REPORT CARD

	1984	1988	1990	1992	1994	1996	*	‡	L	Q
TOTAL	38.6 (2.4)	39.2 (1.7)	36.7 (1.1)	35.8 (1.9)	33.1 (1.5)	31.4 (1.5)	–		–	
Gender										
Male	27.9 (1.9)	25.8 (2.3)	25.9 (1.7)	26.2 (1.9)	23.7 (2.1)	22.2 (1.8)				
Female	49.5 (3.8)	51.0 (2.4)	47.9 (2.1)	46.7 (2.5)	42.0 (2.2)	41.5 (2.3)			–	
Race/Ethnicity										
White	46.3 (2.9)	45.6 (2.0)	42.5 (1.4)	43.3 (2.2)	39.3 (2.4)	36.9 (1.8)	–		–	
Black	16.3 (4.4)	16.8 (2.8)	18.0 (2.4)	9.9 (2.7)	15.6 (2.6)	16.5 (2.3)				
Hispanic	7.8 (4.3)	19.6 (6.3)	25.6 (3.1)	19.7 (4.3)	20.4 (4.2)	18.5 (2.9)				
Other	34.7 (7.8)	44.2 (5.9)	32.0 (5.8)	35.8 (4.4)	30.9 (5.4)	33.8 (4.9)				
Modal Age										
Below Modal Age	42.8 (6.9)	50.4 (4.4)	44.1 (5.4)	44.7 (5.9)	39.4 (4.1)	45.2 (6.5)				
At Modal Age	44.9 (2.4)	45.8 (2.0)	41.9 (1.2)	42.5 (2.9)	38.4 (1.4)	35.4 (1.6)	–		–	
Above Modal Age	14.0 (3.1)	12.1 (3.3)	20.2 (2.0)	16.0 (2.1)	17.3 (3.0)	17.1 (2.9)				
Region										
Northeast	40.2 (4.3)	44.1 (3.6)	45.9 (2.6)	39.2 (3.0)	39.6 (2.6)	39.1 (3.6)				
Southeast	33.8 (5.8)	35.7 (5.0)	30.2 (3.0)	25.5 (4.4)	25.0 (3.2)	21.7 (2.3)				
Central	40.8 (3.6)	40.9 (4.9)	38.5 (3.1)	39.8 (3.0)	31.9 (2.9)	32.5 (3.2)				
West	38.6 (4.3)	36.3 (3.3)	33.3 (1.9)	38.2 (2.8)	35.7 (3.5)	31.6 (2.9)				
Parents' Educaton Level										
Less than H. S.	18.1 (7.2)	20.9 (4.5)	18.3 (3.2)	17.1 (3.5)	18.1 (6.3)	10.8 (3.1)				
Graduated H. S.	30.8 (3.3)	28.8 (2.5)	27.5 (2.5)	24.4 (2.5)	25.4 (2.2)	21.7 (1.7)				
Some Education After H. S.	47.9 (5.7)	45.3 (4.9)	41.0 (3.3)	40.7 (3.3)	34.3 (2.3)	36.0 (3.5)				
Graduated College	50.6 (3.9)	50.0 (3.6)	47.5 (2.6)	46.1 (2.3)	41.9 (2.1)	39.7 (2.5)			–	
Unknown	*****(****)	9.9 (4.5)	9.2 (4.1)	9.1 (5.7)	5.8 (3.1)	10.5 (5.0)				
Type of School										
Public	36.1 (2.4)	37.3 (1.5)	35.0 (0.9)	34.8 (2.1)	32.4 (1.8)	31.1 (1.7)				
Non-public	59.2 (6.3)	50.7 (5.9)	56.4 (7.5)	45.9 (6.0)	38.2 (4.8)	34.4 (7.5)			–	
Quartiles										
Upper	86.3 (2.4)	88.3 (1.8)	83.6 (2.5)	82.3 (3.3)	79.2 (1.9)	78.0 (2.8)			–	
Middle two	33.2 (3.5)	33.6 (2.4)	30.6 (1.2)	29.9 (2.0)	25.8 (2.1)	25.5 (1.7)				
Lower	1.7 (1.1)	1.4 (0.5)	2.2 (0.7)	1.6 (0.7)	1.6 (1.1)	2.2 (0.9)				

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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Table D.15

NAEP 1996 Writing Long-Term Trend Assessment — Grade 11
Percentages of students with Writing scale scores at or above 350

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996	* ‡ L Q
TOTAL	2.1 (0.7)	1.1 (0.4)	4.1 (0.7)	1.9 (0.4)	2.5 (0.3)	2.4 (0.5)	
Gender							
Male	1.1 (0.4)	0.3(****)	1.7 (0.4)	0.7 (0.2)	1.2 (0.2)	1.2 (0.5)	
Female	3.2 (1.5)	1.7 (0.6)	6.5 (1.4)	3.1 (0.8)	3.8 (0.6)	3.8 (0.8)	
Race/Ethnicity							
White	2.7 (0.9)	1.3 (0.5)	5.0 (0.8)	2.4 (0.5)	3.3 (0.5)	3.0 (0.8)	
Black	0.3(****)	0.1(****)	0.9 (0.4)	0.1(****)	0.4(****)	0.7(****)	
Hispanic	0.0(****)	0.2(****)	2.7 (1.5)	0.3(****)	1.3(****)	0.9 (0.5)	
Other	2.3(****)	1.2 (0.8)	3.5 (1.9)	2.7 (1.5)	1.9 (1.2)	3.3 (1.3)	
Modal Age							
Below Modal Age	2.9(****)	2.0 (1.2)	6.6 (2.7)	3.3 (1.3)	3.7 (1.7)	3.1 (1.3)	
At Modal Age	2.6 (0.9)	1.2 (0.4)	4.7 (0.7)	2.3 (0.7)	3.1 (0.3)	3.0 (0.7)	
Above Modal Age	0.1(****)	0.1(****)	1.3 (0.5)	0.3(****)	0.7(****)	0.8 (0.4)	
Region							
Northeast	2.2 (1.3)	1.4 (0.6)	6.6 (1.8)	1.7 (0.7)	3.6 (0.9)	3.4 (1.0)	
Southeast	2.1 (1.4)	0.8(****)	2.7 (1.1)	1.0(****)	1.4 (0.6)	1.4 (0.7)	
Central	2.1 (1.2)	1.1(****)	4.1 (1.0)	2.3 (0.7)	2.2 (0.8)	2.3 (1.0)	
West	2.2(****)	0.9 (0.3)	3.2 (0.7)	2.3 (0.6)	2.9 (0.7)	2.5 (0.6)	
Parents' Educaton Level							
Less than H. S.	0.4(****)	0.2(****)	0.2(****)	0.5(****)	0.7(****)	0.1(****)	
Graduated H. S.	0.9(****)	0.3(****)	1.9 (0.5)	0.6 (0.3)	1.2 (0.6)	1.1 (0.6)	
Some Education After H. S.	3.2 (1.0)	1.0(****)	4.6 (1.4)	2.7 (1.0)	1.9 (0.6)	2.7 (0.9)	
Graduated College	3.6 (1.3)	1.9 (0.6)	6.5 (1.4)	2.6 (0.7)	4.1 (0.7)	3.6 (0.8)	
Unknown	*****(****)	0.0(****)	0.6(****)	0.3(****)	0.0(****)	0.0(****)	
Type of School							
Public	1.9 (0.7)	0.9 (0.2)	3.5 (0.6)	1.9 (0.5)	2.4 (0.4)	2.4 (0.4)	
Non-public	4.5 (2.7)	2.1 (1.4)	10.7 (3.0)	1.9 (1.1)	3.3 (1.5)	3.1(****)	
Quartiles							
Upper	8.4 (2.7)	4.2 (1.5)	15.5 (2.6)	7.1 (1.6)	9.8 (1.4)	9.9 (2.0)	
Middle two	0.1(****)	0.0(****)	0.4 (0.2)	0.2(****)	0.2(****)	0.3 (0.2)	
Lower	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	0.0(****)	

Standard errors of the estimated percentages appear in parentheses. When no value appears (****), statistical tests involving this value should be interpreted with caution; standard error estimates may not be accurately determined and/or the sampling distribution of the statistic does not match statistical test assumptions (See Procedural Appendix).

* Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1984.

‡ Indicates that the percentage in 1996 is significantly larger (+) or smaller (–) than that in 1994.

L Indicates that the positive (+) or negative (–) linear trend is significant.

Q Indicates that the positive (+) or negative (–) quadratic trend is significant.

***** Data are unavailable for this assessment year.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.16

NAEP 1996 Long-Term Trend Writing Results — Grade 4

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996
TOTAL						
Mean	203.8 (1.5)	205.7 (1.6)	201.7 (1.5)	207.1 (1.5)	204.8 (1.6)	207.4 (1.2)
Standard Deviation	36.5 (1.4)	42.0 (0.8)	41.7 (0.8)	38.2 (0.6)	38.3 (0.9)	38.1 (1.2)
Percentiles						
5	143.5 (3.3)	135.4 (3.3)	130.8 (1.8)	142.2 (1.9)	139.6 (2.6)	142.2 (1.8)
10	156.8 (2.7)	151.3 (1.9)	147.2 (2.3)	157.3 (1.3)	154.7 (3.3)	157.7 (1.8)
25	179.2 (2.1)	177.0 (1.6)	174.2 (2.1)	181.9 (1.4)	179.6 (2.3)	182.0 (1.6)
50	204.2 (2.9)	207.0 (2.5)	202.9 (1.7)	208.1 (2.2)	206.1 (1.3)	208.7 (1.3)
75	228.7 (1.5)	235.0 (1.8)	230.8 (2.3)	233.2 (1.6)	231.5 (1.4)	234.0 (2.3)
90	250.5 (2.2)	259.1 (2.1)	254.6 (2.1)	255.8 (1.8)	253.2 (1.3)	255.3 (2.0)
95	262.9 (2.7)	273.7 (2.6)	268.3 (2.7)	268.8 (2.9)	265.6 (2.7)	267.8 (3.1)
Male Students						
Mean	200.5 (2.8)	199.0 (2.3)	195.0 (1.9)	198.3 (1.7)	196.1 (1.7)	200.3 (1.8)
Standard Deviation	36.4 (1.6)	41.5 (1.0)	41.6 (1.1)	37.4 (0.8)	37.6 (1.2)	37.5 (1.4)
Percentiles						
5	140.8 (7.2)	129.1 (4.3)	124.6 (4.0)	135.0 (2.3)	132.6 (3.3)	137.2 (2.9)
10	153.7 (4.3)	145.5 (3.2)	140.4 (3.1)	149.4 (2.2)	146.5 (2.9)	152.0 (1.7)
25	176.7 (2.9)	170.7 (2.5)	167.8 (2.8)	173.7 (1.8)	171.4 (2.3)	175.9 (1.8)
50	200.0 (3.1)	199.2 (3.8)	195.9 (1.9)	199.6 (1.9)	197.4 (2.1)	200.9 (2.8)
75	225.5 (3.1)	228.0 (2.9)	223.8 (1.6)	223.5 (2.3)	222.2 (1.8)	226.1 (2.7)
90	246.3 (2.8)	251.5 (2.7)	247.7 (1.9)	245.6 (3.0)	242.9 (1.6)	248.5 (2.2)
95	260.2 (3.4)	265.7 (3.5)	262.2 (2.5)	258.0 (3.0)	255.7 (2.4)	260.6 (3.3)
Female Students						
Mean	207.6 (3.1)	212.6 (2.0)	208.7 (2.2)	216.1 (1.7)	213.5 (2.2)	214.3 (1.9)
Standard Deviation	36.2 (2.3)	41.4 (1.2)	40.6 (1.1)	36.9 (0.9)	36.9 (1.3)	37.3 (1.2)
Percentiles						
5	146.7 (6.1)	143.3 (2.2)	139.8 (3.6)	153.0 (3.1)	150.7 (3.7)	150.2 (5.6)
10	161.1 (5.5)	158.2 (3.4)	155.4 (3.6)	167.6 (1.5)	164.9 (5.8)	165.1 (2.6)
25	183.5 (3.4)	184.9 (4.5)	181.8 (2.7)	191.7 (2.5)	189.1 (3.5)	189.8 (2.9)
50	208.7 (3.0)	213.5 (2.5)	209.8 (2.9)	217.7 (1.7)	214.9 (1.7)	215.9 (2.1)
75	232.3 (3.4)	241.3 (1.9)	237.0 (2.7)	241.6 (1.5)	239.5 (2.3)	240.2 (3.2)
90	253.7 (7.0)	265.4 (3.8)	260.2 (2.0)	262.9 (1.9)	259.7 (2.1)	260.9 (2.9)
95	265.1 (5.5)	279.7 (2.5)	273.1 (2.7)	275.4 (2.9)	272.1 (2.9)	273.4 (3.9)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.16
(continued)

NAEP 1996 Long-Term Trend Writing Results — Grade 4

Scale Score Means, Standard Deviations, and Percentiles

	1984	1988	1990	1992	1994	1996
White Students						
Mean	210.7 (1.9)	214.9 (1.9)	211.0 (2.0)	216.7 (1.7)	214.4 (1.5)	216.2 (1.6)
Standard Deviation	34.1 (1.1)	38.7 (1.2)	38.2 (0.8)	34.7 (0.7)	34.5 (0.9)	34.9 (1.2)
Percentiles						
5	154.9 (3.6)	151.0 (4.3)	146.4 (3.0)	159.0 (2.3)	155.9 (4.7)	158.6 (3.1)
10	166.6 (3.3)	164.6 (3.1)	161.6 (3.5)	172.1 (1.7)	170.2 (2.9)	170.7 (1.8)
25	187.6 (1.5)	188.5 (1.8)	185.6 (2.9)	193.9 (1.9)	191.5 (2.2)	192.2 (2.2)
50	211.1 (2.2)	215.5 (1.8)	211.4 (1.9)	217.3 (2.3)	215.2 (1.0)	216.9 (2.1)
75	233.2 (1.4)	241.6 (2.1)	237.3 (2.2)	240.4 (1.6)	237.8 (2.1)	240.2 (2.8)
90	255.0 (4.5)	264.6 (2.6)	260.0 (1.6)	260.8 (2.2)	258.1 (1.4)	260.5 (2.5)
95	266.1 (3.5)	278.4 (3.3)	272.5 (2.4)	273.1 (2.8)	270.2 (2.7)	272.4 (3.5)
Black Students						
Mean	181.6 (5.0)	173.3 (4.7)	171.4 (5.4)	175.0 (3.8)	172.7 (3.2)	181.5 (2.3)
Standard Deviation	34.8 (3.3)	39.4 (2.3)	40.3 (1.6)	33.9 (1.6)	35.3 (1.9)	36.5 (1.7)
Percentiles						
5	123.9 (6.5)	108.9 (7.6)	104.8 (5.2)	117.2 (5.7)	113.5 (9.2)	122.1 (6.5)
10	134.9 (4.5)	122.3 (5.9)	119.5 (6.8)	130.5 (4.2)	126.8 (4.8)	135.3 (2.8)
25	159.5 (4.9)	147.7 (5.5)	144.0 (4.9)	152.5 (4.5)	149.7 (4.9)	155.2 (3.3)
50	181.5 (5.5)	172.6 (4.6)	172.0 (6.0)	175.7 (4.2)	172.9 (3.8)	182.2 (6.2)
75	205.2 (13.6)	199.7 (4.6)	198.5 (7.0)	198.2 (3.3)	196.3 (4.0)	206.0 (3.2)
90	227.9 (10.2)	224.4 (6.0)	222.7 (6.5)	217.9 (3.6)	217.3 (6.4)	229.1 (6.2)
95	239.6 (12.0)	237.5 (5.8)	239.0 (23.2)	229.2 (6.4)	231.4 (6.4)	242.0 (5.3)
Hispanic Students						
Mean	188.5 (5.8)	190.3 (3.5)	184.1 (4.1)	189.4 (3.6)	188.5 (3.1)	190.6 (3.2)
Standard Deviation	37.1 (5.3)	39.6 (1.7)	38.8 (1.9)	35.3 (1.6)	35.5 (2.0)	37.3 (1.1)
Percentiles						
5	130.0 (13.1)	125.3 (6.0)	120.3 (7.5)	132.5 (5.1)	131.0 (4.9)	126.2 (4.8)
10	141.2 (12.3)	139.4 (6.1)	134.8 (7.6)	143.7 (5.1)	143.2 (5.2)	141.3 (3.5)
25	161.9 (8.7)	163.2 (5.1)	158.7 (7.1)	166.4 (3.4)	163.6 (4.7)	165.9 (4.3)
50	188.2 (6.4)	190.8 (5.1)	183.7 (5.4)	188.8 (4.3)	188.3 (4.6)	191.9 (3.7)
75	214.2 (8.0)	217.5 (4.5)	210.1 (3.8)	213.2 (5.1)	212.8 (4.0)	216.1 (4.4)
90	234.5 (6.5)	240.7 (4.3)	234.2 (4.8)	234.5 (5.5)	234.2 (5.0)	237.3 (4.5)
95	247.3 (7.5)	256.5 (4.8)	247.8 (5.8)	247.3 (3.5)	246.9 (5.1)	250.5 (5.2)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.17

NAEP 1996 Long-Term Trend Writing Results — Grade 8

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996
TOTAL						
Mean	266.7 (2.0)	263.7 (1.3)	256.6 (1.2)	274.4 (1.3)	265.3 (1.3)	263.6 (1.0)
Standard Deviation	29.5 (1.4)	32.4 (0.6)	37.5 (0.7)	36.3 (0.9)	35.9 (0.7)	36.4 (0.8)
Percentiles						
5	215.7 (4.3)	208.6 (2.9)	194.6 (2.3)	213.7 (2.0)	203.9 (3.4)	202.1 (2.1)
10	227.0 (3.7)	221.9 (2.6)	207.9 (1.9)	227.2 (2.9)	218.0 (2.5)	215.9 (1.3)
25	247.3 (3.1)	242.5 (1.9)	231.4 (1.4)	249.9 (1.5)	241.9 (2.0)	239.9 (1.3)
50	268.3 (2.6)	264.1 (1.4)	256.7 (1.6)	275.0 (1.6)	266.4 (1.3)	264.4 (1.3)
75	287.5 (2.1)	285.7 (1.2)	281.9 (1.7)	299.7 (1.7)	289.8 (1.5)	288.4 (0.9)
90	303.7 (1.8)	305.0 (1.4)	304.4 (1.3)	320.4 (1.7)	310.7 (1.8)	309.7 (1.7)
95	312.9 (2.0)	315.7 (1.8)	318.4 (1.8)	332.4 (1.6)	323.4 (1.5)	321.7 (1.6)
Male Students						
Mean	257.5 (2.3)	253.7 (1.5)	245.6 (1.5)	263.6 (1.9)	254.0 (1.8)	251.1 (1.1)
Standard Deviation	28.9 (1.7)	31.3 (0.9)	36.1 (1.0)	34.8 (1.0)	34.5 (1.0)	34.8 (1.0)
Percentiles						
5	208.0 (4.4)	201.0 (3.7)	187.0 (1.7)	205.8 (3.3)	195.8 (3.1)	191.9 (2.1)
10	219.7 (4.1)	213.0 (2.5)	199.3 (1.8)	218.7 (2.2)	208.3 (2.4)	206.0 (2.5)
25	237.8 (5.7)	233.1 (1.6)	220.7 (2.2)	240.3 (2.6)	230.8 (2.8)	227.8 (2.3)
50	258.6 (3.2)	254.4 (1.4)	245.6 (1.6)	263.7 (2.3)	254.8 (2.5)	252.0 (1.5)
75	278.0 (2.7)	275.0 (1.3)	270.0 (1.8)	288.2 (2.1)	278.4 (2.4)	274.8 (1.5)
90	293.9 (3.0)	293.6 (2.1)	291.9 (2.8)	307.9 (1.8)	297.6 (2.1)	294.9 (1.5)
95	302.9 (2.4)	304.0 (3.5)	304.9 (2.5)	319.5 (2.3)	309.1 (1.4)	306.8 (2.7)
Female Students						
Mean	276.2 (2.4)	273.5 (1.7)	267.9 (1.3)	285.0 (1.3)	277.7 (1.4)	276.2 (1.2)
Standard Deviation	27.0 (1.4)	30.5 (0.6)	35.4 (1.1)	34.6 (1.0)	33.2 (0.7)	33.6 (1.1)
Percentiles						
5	229.3 (4.9)	222.6 (3.3)	210.1 (2.6)	227.0 (4.1)	221.8 (4.3)	219.2 (2.0)
10	241.5 (4.4)	234.3 (1.5)	223.1 (2.3)	239.9 (3.2)	235.1 (3.2)	232.9 (2.3)
25	258.7 (2.7)	253.3 (2.4)	244.2 (1.5)	261.7 (1.6)	255.5 (1.5)	254.2 (1.8)
50	277.1 (3.5)	274.1 (2.3)	267.8 (1.2)	285.7 (2.5)	278.6 (1.0)	277.3 (1.8)
75	295.7 (3.0)	294.4 (1.5)	291.7 (1.7)	308.9 (1.5)	300.5 (1.8)	299.6 (1.5)
90	309.7 (2.4)	312.3 (1.2)	313.6 (1.8)	328.9 (1.3)	320.3 (1.6)	318.3 (2.0)
95	317.6 (3.5)	322.5 (2.0)	327.3 (2.2)	340.1 (3.0)	331.5 (2.5)	329.7 (2.4)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.17
(continued)

NAEP 1996 Long-Term Trend Writing Results — Grade 8

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD naep

	1984	1988	1990	1992	1994	1996
White Students						
Mean	271.7 (2.1)	269.1 (1.3)	262.1 (1.6)	279.2 (1.3)	272.0 (1.4)	271.2 (1.0)
Standard Deviation	27.5 (1.1)	31.1 (0.6)	36.4 (0.7)	35.1 (0.8)	34.1 (0.8)	34.2 (1.0)
Percentiles						
5	224.4 (5.7)	216.5 (2.3)	202.1 (2.3)	220.4 (3.4)	214.0 (3.1)	213.2 (1.9)
10	235.1 (3.2)	229.0 (1.4)	215.3 (2.9)	234.0 (2.6)	228.2 (2.1)	226.8 (3.0)
25	253.4 (2.3)	248.5 (1.8)	237.3 (1.9)	255.5 (1.7)	249.7 (1.7)	249.0 (1.5)
50	272.7 (2.7)	269.9 (1.5)	262.5 (1.6)	280.1 (1.7)	272.8 (2.0)	272.1 (1.1)
75	291.0 (2.3)	290.5 (1.3)	286.9 (1.8)	303.5 (1.9)	295.2 (1.5)	294.5 (1.3)
90	306.3 (2.0)	308.7 (1.7)	308.5 (1.8)	323.7 (2.4)	315.4 (2.0)	314.0 (1.9)
95	315.0 (2.5)	319.1 (1.3)	322.5 (1.8)	335.4 (2.5)	327.2 (2.3)	325.5 (1.8)
Black Students						
Mean	247.1 (5.7)	246.0 (3.5)	239.0 (2.3)	258.1 (4.0)	244.8 (3.4)	241.8 (2.6)
Standard Deviation	27.4 (1.7)	31.0 (1.1)	35.6 (1.9)	36.5 (2.2)	33.5 (2.0)	34.7 (1.7)
Percentiles						
5	200.8 (7.2)	193.6 (5.2)	181.6 (5.7)	200.1 (8.1)	189.6 (6.2)	183.9 (8.2)
10	212.1 (6.8)	205.2 (6.1)	192.9 (4.0)	212.5 (7.4)	200.7 (4.4)	197.1 (6.3)
25	228.5 (6.9)	226.0 (3.4)	215.6 (4.4)	232.2 (4.7)	222.0 (6.1)	218.0 (1.6)
50	247.6 (6.7)	246.6 (4.3)	239.8 (2.4)	257.0 (3.6)	245.1 (3.8)	243.4 (3.5)
75	265.3 (3.7)	266.3 (3.3)	263.3 (2.7)	282.1 (4.6)	268.4 (4.2)	264.8 (3.8)
90	281.3 (5.4)	285.2 (5.7)	284.5 (1.6)	306.3 (3.3)	287.7 (7.1)	284.8 (3.4)
95	291.5 (3.6)	295.7 (4.4)	297.2 (3.1)	318.9 (4.7)	300.1 (3.7)	296.6 (6.7)
Hispanic Students						
Mean	246.9 (6.4)	250.4 (2.5)	245.7 (2.8)	265.0 (2.2)	251.5 (3.3)	246.1 (2.3)
Standard Deviation	30.2 (2.9)	31.0 (1.6)	36.1 (1.7)	35.3 (2.5)	35.9 (1.6)	35.3 (1.3)
Percentiles						
5	197.2 (13.9)	199.2 (5.9)	186.7 (5.4)	203.4 (6.4)	192.3 (4.9)	187.0 (4.4)
10	206.6 (11.7)	209.8 (7.1)	198.8 (3.7)	218.7 (5.1)	204.4 (3.9)	201.8 (4.9)
25	225.3 (7.6)	230.5 (5.3)	220.5 (3.6)	242.0 (5.0)	227.2 (5.1)	222.6 (2.9)
50	247.2 (7.0)	251.2 (2.9)	246.5 (4.7)	265.1 (2.1)	251.9 (3.2)	246.3 (2.3)
75	268.4 (4.2)	270.9 (2.4)	269.7 (5.0)	288.2 (4.3)	276.3 (3.9)	269.7 (2.6)
90	286.1 (5.8)	289.5 (2.4)	292.3 (3.3)	310.2 (3.3)	297.7 (6.2)	290.9 (4.0)
95	298.1 (7.7)	300.6 (5.4)	304.6 (3.3)	323.8 (3.5)	307.9 (5.7)	303.4 (5.6)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.18

NAEP 1996 Long-Term Trend Writing Results — Grade 11

Scale Score Means, Standard Deviations, and Percentiles

THE NATION'S REPORT CARD

	1984	1988	1990	1992	1994	1996
TOTAL						
Mean	289.7 (1.6)	291.3 (1.3)	287.1 (1.0)	287.3 (1.4)	284.6 (1.2)	283.0 (1.2)
Standard Deviation	31.8 (0.6)	27.9 (1.1)	36.5 (1.1)	32.0 (0.7)	34.4 (0.8)	34.6 (0.7)
Percentiles						
5	235.7 (2.3)	244.4 (4.5)	226.7 (2.7)	233.2 (3.3)	227.2 (2.0)	224.6 (1.6)
10	248.9 (1.7)	255.2 (2.4)	240.3 (2.4)	245.7 (2.1)	240.5 (2.1)	238.2 (2.0)
25	268.9 (1.7)	273.1 (1.9)	262.3 (1.8)	266.1 (1.7)	262.3 (1.7)	259.8 (1.4)
50	290.9 (1.9)	292.4 (1.3)	287.7 (1.3)	288.2 (1.2)	285.3 (1.7)	283.2 (1.8)
75	312.1 (1.7)	310.6 (1.2)	311.9 (1.4)	309.7 (1.7)	308.0 (1.5)	306.8 (1.2)
90	329.5 (2.6)	326.3 (1.4)	334.0 (1.8)	327.6 (1.5)	328.0 (1.4)	327.2 (1.8)
95	340.0 (2.9)	334.8 (1.6)	346.6 (2.7)	338.1 (2.3)	340.3 (1.3)	339.1 (3.0)
Male Students						
Mean	281.1 (1.4)	282.2 (2.0)	276.4 (1.6)	279.4 (1.2)	275.9 (1.5)	274.5 (1.4)
Standard Deviation	31.5 (0.8)	26.8 (1.0)	35.2 (0.8)	31.2 (1.1)	33.8 (1.1)	33.5 (1.0)
Percentiles						
5	227.2 (3.5)	236.7 (4.2)	218.2 (2.8)	226.9 (3.2)	219.4 (3.1)	217.8 (2.1)
10	240.7 (2.4)	248.2 (3.5)	231.3 (2.6)	239.0 (2.0)	232.9 (4.8)	230.1 (2.3)
25	260.3 (1.4)	264.9 (2.4)	252.8 (2.0)	258.6 (1.7)	254.3 (1.7)	252.2 (2.2)
50	281.5 (1.9)	282.9 (2.0)	276.2 (1.8)	280.5 (1.2)	276.8 (2.8)	275.0 (1.0)
75	303.0 (2.0)	300.6 (1.7)	300.9 (1.6)	301.3 (1.7)	298.6 (2.2)	297.0 (1.8)
90	320.8 (3.2)	316.0 (1.9)	321.4 (1.6)	318.5 (1.6)	318.9 (2.0)	317.7 (3.0)
95	331.4 (2.6)	324.5 (2.6)	333.1 (1.8)	328.6 (2.2)	330.9 (1.9)	328.4 (3.3)
Female Students						
Mean	298.6 (2.5)	299.3 (1.2)	298.2 (1.5)	296.4 (2.0)	292.8 (1.5)	292.3 (1.4)
Standard Deviation	29.5 (1.1)	26.4 (1.3)	34.4 (1.6)	30.4 (0.6)	33.0 (0.9)	33.3 (0.9)
Percentiles						
5	249.1 (4.4)	254.2 (3.8)	241.2 (4.0)	244.0 (1.9)	237.4 (2.8)	237.0 (7.0)
10	261.4 (4.0)	265.4 (2.7)	253.0 (3.0)	256.6 (3.1)	250.1 (3.6)	249.4 (2.3)
25	279.3 (3.1)	282.0 (1.8)	274.9 (1.6)	276.1 (2.2)	271.0 (1.6)	269.8 (2.3)
50	299.5 (2.8)	300.7 (1.7)	298.4 (1.6)	297.4 (2.3)	293.4 (2.2)	292.4 (2.1)
75	318.9 (2.8)	317.8 (1.8)	321.8 (1.5)	317.6 (2.1)	314.9 (0.9)	315.3 (1.6)
90	335.0 (4.1)	331.7 (1.7)	342.6 (2.6)	334.9 (1.8)	334.6 (2.4)	334.9 (2.6)
95	344.8 (4.9)	340.5 (1.7)	354.3 (4.1)	344.3 (2.8)	346.3 (2.3)	346.9 (2.7)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

Table D.18
(continued)

NAEP 1996 Long-Term Trend Writing Results — Grade 11

Scale Score Means, Standard Deviations, and Percentiles

	1984	1988	1990	1992	1994	1996
White Students						
Mean	296.8 (1.8)	296.2 (1.3)	292.8 (1.2)	294.1 (1.2)	290.8 (1.4)	288.9 (1.5)
Standard Deviation	28.5 (1.0)	26.2 (1.2)	35.2 (1.2)	29.6 (0.9)	32.7 (0.8)	33.0 (0.8)
Percentiles						
5	249.2 (3.8)	252.2 (3.7)	234.7 (3.4)	243.8 (1.2)	237.1 (2.5)	234.4 (3.0)
10	260.0 (2.2)	262.7 (2.8)	247.2 (2.7)	255.6 (2.0)	248.5 (1.3)	246.6 (2.7)
25	277.0 (1.4)	278.9 (1.7)	268.9 (1.6)	274.8 (1.1)	268.9 (1.5)	266.5 (1.5)
50	297.6 (2.0)	297.1 (1.2)	293.7 (1.1)	295.0 (1.3)	291.0 (2.2)	288.9 (1.3)
75	316.4 (2.6)	314.5 (1.3)	317.0 (1.3)	314.2 (1.8)	313.0 (1.6)	311.4 (2.0)
90	333.0 (2.6)	329.3 (1.3)	338.2 (2.2)	331.4 (1.4)	332.7 (1.9)	331.1 (2.7)
95	343.0 (4.0)	337.7 (2.8)	349.6 (2.8)	341.0 (2.5)	344.3 (2.1)	342.7 (3.7)
Black Students						
Mean	270.3 (3.6)	275.2 (2.9)	268.2 (2.3)	263.2 (3.2)	267.3 (2.2)	267.2 (3.0)
Standard Deviation	29.6 (2.4)	26.0 (1.4)	34.3 (1.1)	28.9 (1.4)	32.3 (1.3)	33.2 (1.7)
Percentiles						
5	221.8 (8.5)	231.7 (6.2)	213.1 (5.4)	216.4 (5.0)	213.6 (7.0)	212.8 (6.6)
10	231.8 (6.8)	242.8 (2.9)	224.7 (3.0)	226.3 (3.2)	225.6 (5.1)	223.8 (6.2)
25	251.6 (5.5)	257.5 (3.3)	244.9 (2.3)	244.7 (5.8)	246.1 (3.4)	244.6 (5.7)
50	270.0 (3.3)	275.7 (3.0)	268.4 (3.2)	263.8 (3.9)	267.4 (2.6)	267.2 (3.5)
75	289.6 (4.6)	293.8 (3.0)	291.4 (4.0)	282.6 (4.3)	289.0 (2.4)	288.7 (3.1)
90	308.9 (7.8)	308.9 (4.9)	311.0 (2.3)	300.5 (4.1)	308.9 (2.1)	310.2 (5.3)
95	317.6 (5.0)	318.1 (3.8)	324.0 (4.4)	309.3 (5.1)	320.2 (3.2)	324.3 (9.6)
Hispanic Students						
Mean	259.1 (6.6)	273.8 (4.4)	276.9 (2.6)	273.6 (3.8)	271.3 (4.0)	268.6 (2.5)
Standard Deviation	30.8 (2.0)	28.1 (1.7)	36.2 (2.3)	31.3 (1.5)	34.8 (2.2)	34.3 (1.6)
Percentiles						
5	207.5 (10.8)	228.3 (6.2)	217.4 (9.7)	220.4 (10.6)	211.5 (7.9)	213.4 (9.3)
10	216.5 (6.5)	235.9 (8.4)	231.5 (4.1)	234.0 (2.7)	224.5 (8.3)	224.3 (3.2)
25	238.2 (7.5)	256.1 (6.2)	252.6 (4.0)	252.4 (6.0)	249.8 (6.6)	245.2 (3.3)
50	260.3 (8.2)	274.1 (3.9)	275.4 (3.2)	275.3 (4.6)	273.3 (4.9)	268.0 (3.2)
75	281.1 (7.1)	294.3 (8.7)	300.8 (6.0)	294.1 (4.9)	294.3 (4.0)	291.3 (6.6)
90	297.3 (9.8)	309.0 (5.6)	324.2 (3.9)	313.7 (3.5)	312.9 (3.0)	312.1 (3.1)
95	305.7 (16.8)	316.3 (5.4)	337.7 (15.8)	323.7 (3.1)	326.7 (6.8)	325.7 (6.9)

The standard errors of the estimated scale scores appear in parentheses.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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